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THE SURGICAL TREATMENT OF PEPTIC ULCER

Based Upon One Hundred and Thirty Subtotal Gastrectomies for Peptic Ulcer

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BOSTON

OWING to the fact that our views concerning surgery in patients with peptic ulcer have in the last few years remained somewhat uncrystallized, we have been unwilling to take any very definite position as relates to surgical treatment. It is, of course, always possible to arrive at some conclusion on this subject through careful and constant perusal of the current literature. We have always felt, however, that having the good fortune to possess a large amount of surgical material, anything emanating from this clinic should be the result of our own experience rather than deductions from that of others, and that our findings, whether ultimately proved right or wrong, should at least have the recommendation of being fundamentally practical and not theoretical.

Since the establishment of a gastroenterologic department in 1924, there have been treated in the clinic over 3000 patients with gastric or duodenal ulcer or both. During this period there have of necessity been many patients who required surgery of a variety of types. Furthermore, during the latter part of this time there has arisen in our minds a pronounced skepticism as to the relative value of the conservative surgical measures commonly applied in the past (gastroenterostomy, gastroduodenostomy and pyloroplasty). We have not only come to doubt the permanent effectiveness of some of these procedures, but have reached a definite, and we believe more universally admitted, conviction that postoperative jejunal ulcer, a lesion more intractable and more serious to operate upon than the original duodenal or gastric ulcer, follows these procedures in a percentage of cases too high to justify their routine employment.

Even though the present situation regarding peptic ulcer still seems somewhat unsatisfactory, we have seen within the last fifteen years real progress in its management. It is now generally admitted that almost no patients with ulcer are in need of immediate surgery. No longer do we find ardent advocates of two distinctly opposed methods of treatment, operative and nonoperative. Instead, as should be the case, the surgeon ascertains whether or not the patient can be relieved and kept free of his ulcer symptoms by nonoperative measures. Surgery is being applied in its proper place; that is, when nonoperative measures have failed and when the intensity of the resulting symptoms justifies the surgical risk. Patients are still not infrequently discharged after such procedures without adequate arrangements for careful postoperative medical management; nevertheless, the value of this plan is almost generally accepted, and in all organized groups is almost universally applied. No longer are all gastric ulcers thought to be forerunners of gastric malignancy, and no longer are they immediately submitted to surgery. Provided malignancy can be ruled out, it is admitted that gastric ulcer, the lesion in which, not so many years ago, medical measures were forbidden, is now accepted as being more tractable to nonoperative management than is duodenal ulcer; and real progress has been made by gastroenterologists in the preoperative segregation of gastric lesions which are malignant from those which are not.

In spite of the fact, therefore, that the peptic ulcer situation is still far from well standardized or entirely satisfactory as to cure (operative and nonoperative) and mortality (operative and nonoperative), very real and encouraging progress has been made in the management of these conditions.

We have repeatedly stated our views as to what the indications for surgery are for the patient while under medical management; they have in the main continued unchanged. The patients in whom surgery must be considered are (1) those whose symptoms persist and are of disturbing intensity in spite of adequate medical management; (2) those with pyloric obstruction which cannot be

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relieved by rest and neutralization of gastric acidity; (3) obviously those with perforation; (4) those with gastric ulcers in whom the question of malignancy cannot be ruled out and (5) those with gastric or duodenal ulcer in whom repeated hemorrhage has taken place in spite of good medical treatment.

Of some of these indications for surgery but little need be said. Perforation as an emergency situation settles itself. If a patient has pain in spite of a good nonoperative ulcer regime, he either accepts the pain or accepts surgery. If, as in gastric ulcer, the question of malignancy arises and cannot be disproved, the indication for radical surgery is clean-cut and undebatable. The two situations where indecision and unwise delay are most apt to arise are those occurring in patients with varying degrees of pyloric obstruction associated with active duodenal ulcer, and in those with peptic ulcer in whom repeated bleeding has taken place.

Pyloric obstruction associated with active duodenal ulcer symptoms is frequently relievable by rest, neutralization of the gastric acidity and relaxation of the pyloric spasm. On the other hand, there is hardly a state associated with duodenal ulcer in which temporary relief can more often be obtained, only to have the original obstructive symptoms return, than in the pyloric obstructions and duodenal deformities so frequently associated with active duodenal ulcerations. It is in this group of cases that we have occasionally carried along with nonsurgical measures patients in whom, in reviewing our experience, we feel surgery might properly have been applied earlier. It is with patients in this group that the question of surgery must be constantly under active consideration. If relief from pyloric obstruction occurs more than once following a return of obstructive symptoms, the question of surgery should be considered most seriously.

So many patients with duodenal ulcer have hemorrhages and recover from them that, as we have stated in previous writings, the matter of hemorrhages in patients with peptic ulcer is often taken altogether too lightly by both patients and physicians. When a patient with a duodenal ulcer has a hemorrhage, except for the acute mucosal erosion ulcers, the bleeding is usually from an ulcer on the posterior wall of the duodenum. The ulcer is of the progressively eroding type and one which, in most cases, has eroded through the pancreaticoduodenalis artery as it runs along the posterior wall of the duodenum. When these ulcers are exposed by the surgeon by an incision into the duodenum (Fig. 1*a*), as all who have had experience with them are aware, they present a deep, chronically calloused bed, with a lateral opening into the wall of the artery as it presents in the base of the ulcer. Blood is pouring from this opening, or else it is temporarily occluded by a small raspberrylike clot of coagulated blood which has accumulated as the result of the drop in blood pressure caused by the massive hemorrhage when the wall of the artery was digested away.

That these massive hemorrhages should not be taken too lightly is proved by the fact that of all the patients having them while in the hospital under our management, 5 per cent died in spite of

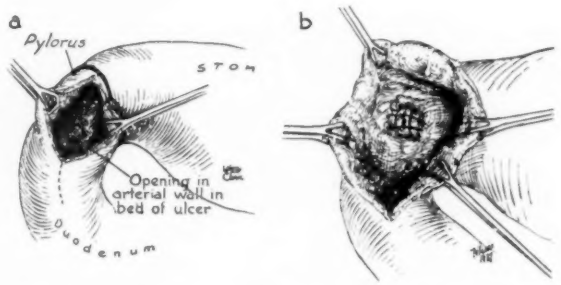


Fig. 1. *A. Posterior wall ulcer with eroded vessel. A longitudinal incision is made through the anterior wall of the duodenum and pyloric sphincter, exposing the ulcer on the posterior wall, with the bleeding artery in its base.*

B. Four crossed mattress sutures of silk are passed through the periphery of the ulcer and tied, thus effectively controlling all bleeding.

all measures of control. When one realizes also that our highest percentage of failure of nonoperative treatment is in patients who have had hemorrhages before coming to the clinic for treatment, it becomes obvious that the question of surgery in this group of cases must likewise be given very active consideration.

Everyone dealing with a large number of patients with peptic ulcer is acutely aware that they present quite different types of hemorrhage which, in our opinion, require two quite different types of management; they require also the highest degree of discriminating surgical judgment and experience in the decision for or against their immediate or deferred operative treatment.

There is the common type of single hemorrhage with vomiting or with black stools, at times followed on the same day or the next by another hemorrhage, from which the patient recovers uneventfully without recurrence of the bleeding. It is in this type of limited bleeding from a peptic ulcer that one wishes to avoid immediate operation. With failure of the hemorrhage to recur, there is no immediate danger of a fatality. Pa-

tients who have recently bled are notably poor candidates for radical gastric operations, and provided an adequate nonoperative regime has not been applied, the trial of such measures will in most cases settle by relief or failure the question of the need for surgery. If, under medical measures, hemorrhage does not recur and the patient is relieved of his ulcer symptoms, surgery does not need to be considered. If, on the other hand, bleeding does recur in spite of good medical management, radical surgery at once becomes justified, since the recurrence of bleeding is a certain indication that the activity of the ulcer is uncontrolled. This criterion is quite universally agreed upon, and acceptably provides for the management of the patient with a bleeding ulcer who is not an acute emergency, and in whom the distinct possibility of an immediate fatality does not arise.

In patients with repeatedly recurring massive hemorrhages from a peptic ulcer,—the second and more serious group,—the pursuance of the above plan would in many cases result in a fatality. If two or three such hemorrhages occur within from twenty-four to forty-eight hours, immediate surgery must be considered, no matter how bad the risk and no matter how undesirable the patient's condition as the result of the blood loss. It is here that the surgeon must decide whether he will risk the possibility of having the patient die in an immediate attempt to control the bleeding, or whether he will postpone operation, with the chance that the patient may die; if the latter occurs, he will suffer from the disturbing consciousness that had the attempt been made earlier success might have crowned the venture. We have personally experienced all the soul-probing emotions associated with the various aspects of this situation: the depression of withholding surgery entirely, only to see a fatality follow as the result of recurring bleeding; the troubled conscience from having delayed this dangerous surgical attack until, when it was done, it was too late to accomplish successful control; and the gratifying elation of accomplishing not only control of the bleeding but also cure of the ulcer by bold removal of the duodenum and ulcer in the face of a seemingly hopeless state of exsanguination. With a sufficient number of donors, patients today can be supplied with blood by massive constant drip transfusion given in two or four extremities almost as rapidly as it can pour from the vessel which bleeds so commonly in the posterior eroding duodenal ulcer. When, therefore, repeated serious massive hemorrhages occur, radical removal of the ulcer or transfixion of its base with silk sutures as a temporary measure, together with repeated transfusions, should be seriously considered (Fig. 1*b*).

The mortality of this extremely hazardous procedure will of necessity be so high that the nicest discrimination and experienced surgical judgment in applying it are necessary. By repeated transfusions these patients can be kept for a short time in a reasonably good condition until the recurrence of massive bleeding shows that it will not cease spontaneously, the risk involved in an attack on the bleeding ulcer itself thus becoming justified. If the surgeon delays operating until quite sure that a fatality will otherwise result, the patient will of necessity be in poor condition for an extensive operative procedure. Yet if the surgeon does a radical operation upon a patient who is still in good condition and a fatality results, his conscience will always be troubled by the thought that with further delay cessation of the bleeding might have occurred.

Such are our responsibilities. In these situations the value of extensive surgical experience and of discriminating judgment, based upon actual experience, far outweighs that of mere technical skill.

If it is settled that, because of the recurrent bleeding, the situation is desperate and the risk justified, the decision must then be made as to what should be done surgically. No one has had any very large experience with this situation because, fortunately for patients, this type of recurring massive bleeding does not occur in a large number of cases.

There are two methods of surgical approach to this problem. One is immediate subtotal gastrectomy, with removal of the ulcer-bearing portion of the duodenum and ligation of the bleeding vessel; the other is incision through the pyloric sphincter and the anterior wall of the upper portion of the duodenum, such that the ulcer on the posterior wall of the duodenum with the bleeding vessel in its base, as here shown (Fig. 1*a*), is demonstrated. Silk stitches are passed through the periphery of the ulcer, as shown in Figure 1*b*, and then tied so that bleeding from the base of the ulcer is controlled. Silk is far superior to catgut; as in such a case last year, for example, the use of transfixion sutures of catgut was combined with gastroenterostomy, only to have the bleeding recur at the end of seven days, probably as the result of digestion of the catgut. This necessitated immediate partial gastrectomy with removal of the ulcer; fortunately the outcome was successful. No one can lay down a final rule on this subject. We can only say, as the result of our experience, that in patients with recurring massive hemorrhage an attempt must be made to control the bleeding vessel. The question of whether to ligate it by transfixion suture or to eliminate it by subtotal gastrectomy must be settled by the operator on the basis of the patient's age and condition, his own experience, the site and

state of the ulcer, and the surgical equipment available.

As stated at the beginning of this discussion, until recently our views on the surgical treatment of peptic ulcer had not been sufficiently clarified to permit us to take a definite position. Now after having performed 130 subtotal gastrectomies for peptic ulcer and having seen so many patients with jejunal ulcer after gastroenterostomy, we feel certain that gastroenterostomy is an operation to be avoided when possible in patients with peptic ulcer, and that high subtotal gastrectomy, while by no means an entirely satisfactory procedure, is for patients suited to it the best surgical method. It is the operation which is followed by the lowest values in gastric acids, by the lowest percentage of recurrent ulcers and by the most complete relief from digestive difficulties.

Since European surgeons have been such uncompromising advocates of subtotal gastrectomy and unalterably opposed to gastroenterostomy, and since there have been such contradictory opinions in this country as to the value, risk and justification of subtotal gastrectomy as against gastroenterostomy, the statement that subtotal gastrectomy is the best surgical method of caring for all patients with peptic ulcer requires qualification; for we have frequently encountered cases in which, while subtotal gastrectomy together with removal of the duodenum and its ulcer may be desirable, the risk does not justify the operation. In such cases the greater safety of a less satisfactory operation amply justifies its occasional employment.

Of our 3000 patients, approximately 90 per cent have had the duodenal type of peptic ulcer and 10 per cent the gastric. For that reason, the majority of subtotal gastrectomies have been done for duodenal ulcer, for the most part old, indurated ulcers of the posterior wall of the duodenum which have eroded into the head of the pancreas and the retroduodenal tissue.

We are impressed with the fact that the really difficult part of subtotal gastrectomy for duodenal ulcer, and often the most time-consuming, is the removal from the pancreas of the scarred, indurated, ulcer-bearing first portion of the duodenum. This part of the procedure is often extremely trying because there are so many small vessels running from the head of the pancreas to the posterior wall; because the inflammatory reaction about the ulcer makes the wall so friable and because the induration in the posterior wall often extends so far down the duodenum that it approaches that portion where the common duct enters. Several times we have encountered ulcers so low that it was impossible to remove enough of the duodenum to get the ulcer out and still have enough left to close the remaining stump without including the entrance of the common duct in the closure stitch.

In such cases, and in patients who did not seem to be able to stand a prolonged operative procedure, when massive recurring hemorrhage was not present, we have (as has been proposed particularly by the European advocates of partial gastrectomy) left the ulcer in situ, and either closed the duodenal stump above it or cut the stomach off a little proximal to the pylorus, inverted the proximal end and done a high resection of the gastric stump (Fig. 2). This has definitely lessened the time of the operation, and by enabling us to avoid dissecting the ulcer from the head of the pancreas

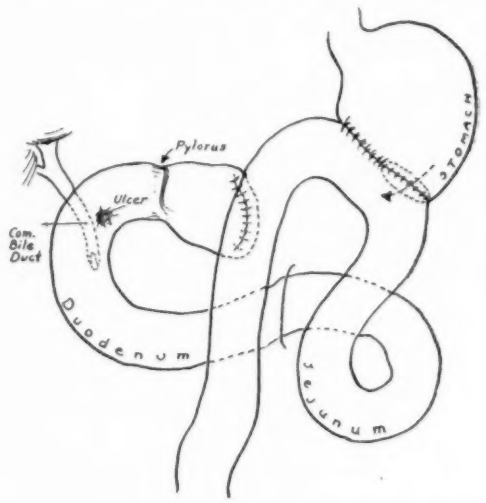


Fig. 2. *A markedly adherent and indurated duodenal ulcer has been left unremoved. The stomach is divided above the pylorus and the pyloric stump inverted. The usual high subtotal gastric resection is then done.*

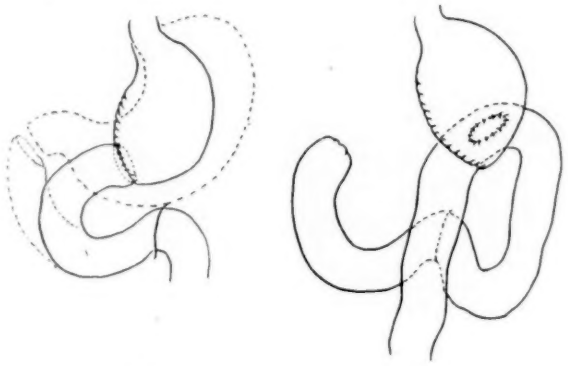
has materially decreased the risk. We have done this successfully in 19 patients, and in a recent follow-up of 15* of these cases it was shown that 14 were well and free from symptoms. In the remaining case an ulcer developed in the gastric stump at the suture line. This produced a mass which could be palpated in the epigastrium, but which disappeared with bed rest and a medical regime. The patient has subsequently remained symptom-free for some months.

Our failure to appreciate the importance of one point in this procedure undoubtedly caused one fatality: one must be absolutely certain of the patency of the pylorus if the stomach is to be cut off and turned in, proximal to the pylorus as shown in Figure 2. In the case mentioned the pylorus failed to permit the accumulated secretion in the lower end of the stomach to pass, with the result that the inverted lower end ruptured and produced a fatal peritonitis, as shown by autopsy. Where we have made sure of the patency of the

*The other 4 were done too recently for follow-up.

pylorus and have left sufficient stomach between the pylorus and the point at which it is cut off so that it can be turned in without tension, this complication has not arisen.

Subtotal gastrectomy for ulcer, duodenal or gastric, exclusive of the cases tabulated above, has

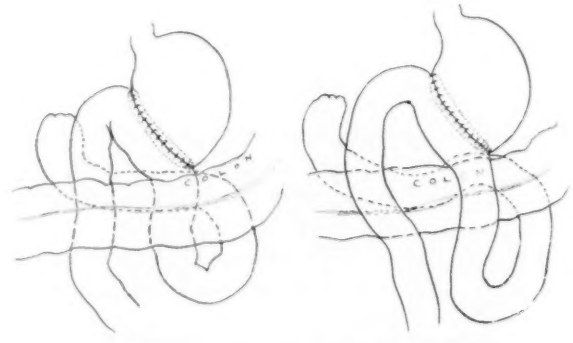


A B

Fig. 3. *A. Billroth I, partial gastrectomy. Following the resection the duodenum is reunited to the resected end of the stomach, thus restoring normal gastroduodenal continuity. The extent of the stomach resection is apt to be too limited by this type of operation.*

B. Billroth II, partial gastrectomy. Following the resection and closure of the end of the stomach, a posterior gastroenterostomy is employed to restore gastrointestinal continuity. The height of the resection is also limited with this procedure.

been done in 130 patients. The mortality in the entire series was 18 per cent, and of the remainder 93 per cent are well and 5 patients have had what appeared to be a recurrent ulcer. The mortality rate in the past year in 34 cases has been reduced to 11 per cent. This rate includes resection



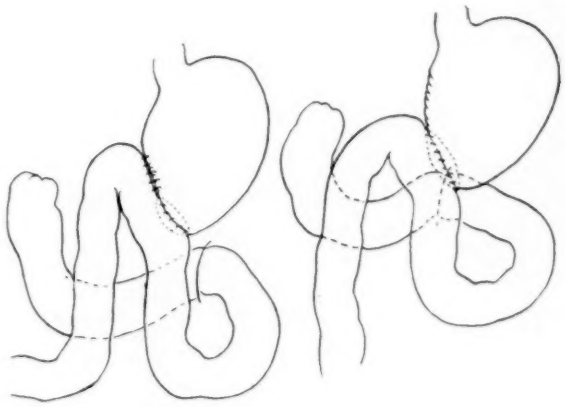
RETROCOLIC. ANTEROCOLIC.

Fig. 4. *Polya subtotal gastrectomy. The side of the jejunum is anastomosed to the entire open end of the resected stomach. The gastrojejunostomy may be either antecolic or retrocolic.*

for jejunal ulcer and gastrocolic fistula, and would be materially lower if these more serious lesions were excluded.

The types of operation which we have employed are the Billroth I, in a limited number of cases, the Polya, and the Hoffmeister modification of the Polya. Line drawings illustrating the plan of these procedures are shown in Figures 3, 4 and 5. As stated in the legends, we believe that the Hoffmeister type of anastomosis after partial gastrectomy, with use of the DePetz sewing machine (Fig. 6) is the quickest operation, and it is most commonly employed by us at the present time.

In a follow-up of 74 patients upon whom subtotal gastrectomy together with removal of the duodenum has been done, 64 per cent have shown an anacidity or a very low acidity (less than 10 per cent). The acidity has been found to be over 10 per cent in 31 per cent. Eighty-four per cent have had a satisfactory result. Nine per cent have



HOFFMEISTER MODIFIED. HOFFMEISTER.

Fig. 5. *Hoffmeister type of subtotal gastrectomy. The upper two thirds of the transected end of the stomach is closed and the anastomosis made between the lower third and the jejunum. This method is modified by buttressing the jejunum against the closed end of the stomach. The jejunal loop is brought anterior to the colon.*

had a good but not entirely satisfactory result, and 7 per cent have had a recurrent jejunal ulcer at the line of anastomosis. Only 1 of these cases, however, has required reoperation.

We shall not dwell extensively here upon the technical aspects of subtotal gastrectomy, but shall leave that discussion for publication in a journal devoted exclusively to surgery. Nevertheless, after considerable experience with these operations, and after the extensive trial of different types of resection, of anastomosis, of suture material in the anastomosis, of wound-closure and of anesthesia, we feel that at least a general discussion of our experiences and conclusions with some of these problems is inseparably linked with any discourse upon the surgical management of patients with intractable peptic ulcer.

In a discussion of the type of partial gastrectomy to employ, certain general statements may be made. The first of these is that if a patient, after medical treatment has failed, is to be submitted to the hazard of partial gastrectomy, the type of operation done should be the one which offers the greatest chance of a low or absent gastric acidity postoperatively, the lowest possible chance of recurrent ulcer, and the fewest possible digestive difficulties afterward. The operation most apt to meet the above requirements is high subtotal gastrectomy; by this is meant the removal of from three fourths to four fifths of the stomach. This implies that the line of transection of the stomach must start close

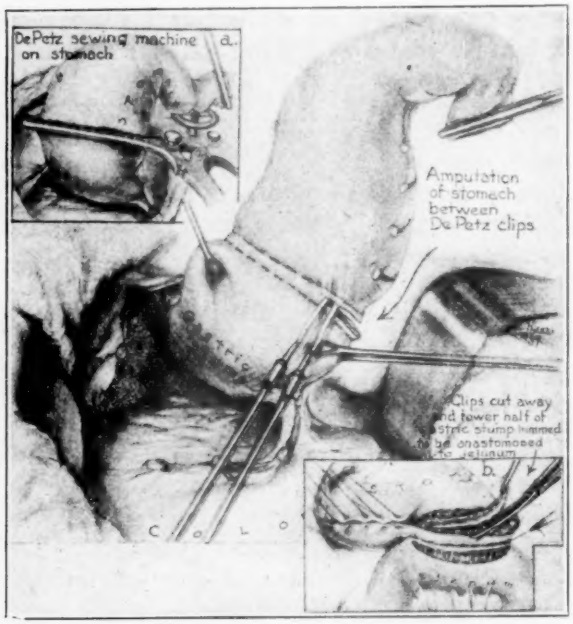


Fig. 6. *The Hoffmeister method of subtotal gastrectomy employed at the Lahey Clinic. The method of employing the DePetz clamp for applying the clips is illustrated in insert A. The stomach is divided by the cautery between the DePetz clips. Insert B illustrates the location of the gastrojejunostomy. This has proved the most satisfactory method of resection in our hands.*

to the angle made by the lesser curvature and the point where the esophagus enters the stomach. It is important to establish this point, since most of the criticism of methods of doing subtotal gastrectomy is based on the fact that they do not permit high and complete enough resections of the stomach.

In order that readers not intimately familiar with the different types of gastric resections may have a clear understanding of the different methods, line drawings of the Billroth I, Billroth II, Polya, and Hoffmeister with posterior and anterior jejunal anastomoses are here included (Figs. 3, 4 and 5). With these in mind the reasons for advocating one type of subtotal gastrectomy and for rejecting and criticizing others can be better understood.

There is no question in our minds that the Billroth I operation, in which a direct end-to-end anastomosis is made between the open end of the duodenum and a portion of the cut end of the stomach after a section of the latter has been removed, is the safest of all the types of gastric resection, if one makes sure that the end of the stomach can be brought over far enough to be sutured to the end of the duodenum without tension. This operation can be performed in a shorter time than any other type of gastric resection. There is almost no exposure and contamination of the general peritoneal cavity, since the operation is performed above the level of the transverse colon and with the omentum undisturbed and covering the small intestine. The gastric contents are discharged into the duodenum, the structure naturally fitted to receive them. This anastomosis functions very satisfactorily, and the period of gastric stasis following the operation is relatively short. It is, however, a poor operation for patients with intractable peptic ulcer. In the first place, a great majority of ulcers are duodenal, and most intractable duodenal ulcers have so scarred and distorted the duodenum that after the indurated ulcer has been dissected out of the head of the pancreas the duodenal stump is of inadequate length to anastomose safely to the cut end of the resected stomach. In the second place, and even more important because the operator is acutely conscious of the need of making the union between the duodenum and stomach without tension, there is an unavoidable tendency to leave sufficient stomach for this to be done readily: the result is the performance of inadequate subtotal gastrectomies. We have recently had to reoperate upon a patient upon whom a Billroth I partial gastrectomy had been done in the clinic for hematemesis only three years before. A high Hoffmeister subtotal gastrectomy was necessary because of a penetrating type of posterior wall duodenal ulcer, and at the second operation we were impressed with the large amount of the stomach which had been left behind when the Billroth I operation was done.

The Billroth II subtotal gastrectomy is an excellent operation, but, as shown in the line drawings, in order to re-establish the gastrointestinal stream a gastroenterostomy must be done; here there will likewise be a constant tendency to leave sufficient stomach so that a gastroenterostomy can be done without tension and with clamps. For largely the same reasons as apply to the Billroth I operation, we have not employed this procedure

for a number of years, and feel that the same criticisms are applicable to it.

The two types of subtotal gastrectomy which permit a high and radical removal of the stomach are the Polya (Fig. 4) and the Hoffmeister (Fig. 5). Whether one anastomoses the side of the jejunum to the entire open end of the resected stomach (Polya), or closes the upper half of the transected stomach and anastomoses the side of the jejunum to the opened lower half or third of the transected stomach and buttresses the jejunum over the closed upper fraction of the stomach (Hoffmeister), is a matter of personal taste and experience. For some years, we have forsaken the Polya type of anastomosis, and transected the stomach with the DePetz sewing machine, opened the lower third of the closed end of the stomach and anastomosed the side of the jejunum to this segment (Hoffmeister, Fig. 6). As stated above and

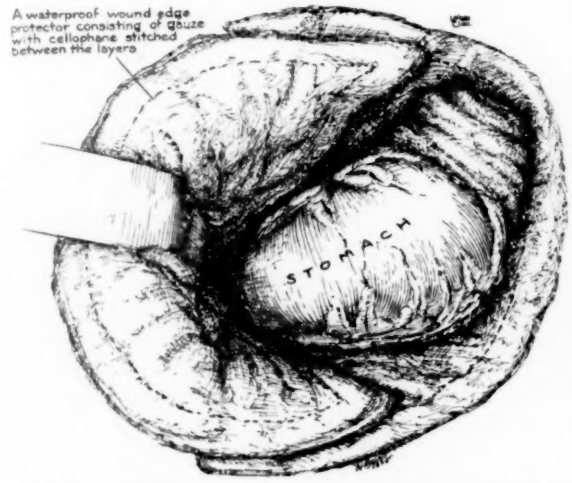


Fig. 7. *The cellophane waterproof pad used as shown in this illustration to protect the wound edges from contamination is made by placing a single layer of cellophane between two layers of gauze. The edges are then hemmed on a sewing machine. These pads are sterilized by autoclaving. When wet they become soft and adaptable to wound edges.*

as shown in the line drawings, the redundant upper loop of jejunum is then buttressed over the closed upper two thirds of the anterior end of the stomach to reinforce that closure. No intestinal clamps have been employed for several years in any of our gastric resections, as we feel certain that it is not so easy to do high gastric resections with stomach clamps as it is without them. We feel, as with the Billroth I and II operations, that when stomach clamps are employed, owing to the difficulty of applying them high up on the gastric stump under the left costal arch, the tendency will always be to make the resection at the level at which they can be placed. Because these clamps are applied so high on the stomach there will be a tendency for it to slip out of them and therefore for the surgeon to cut the stomach distal to the clamps so close to them that difficulty in safely applying the suture line will arise. With these difficulties go increased dangers of soiling and contamination, two of the most frequent causes of failures and fatalities with this operation. By using the DePetz sewing machine, employing suction to empty the stomach through a small opening before the anastomosis is made, and utilizing the cellophane waterproof pads (Fig. 7) devised by one of us

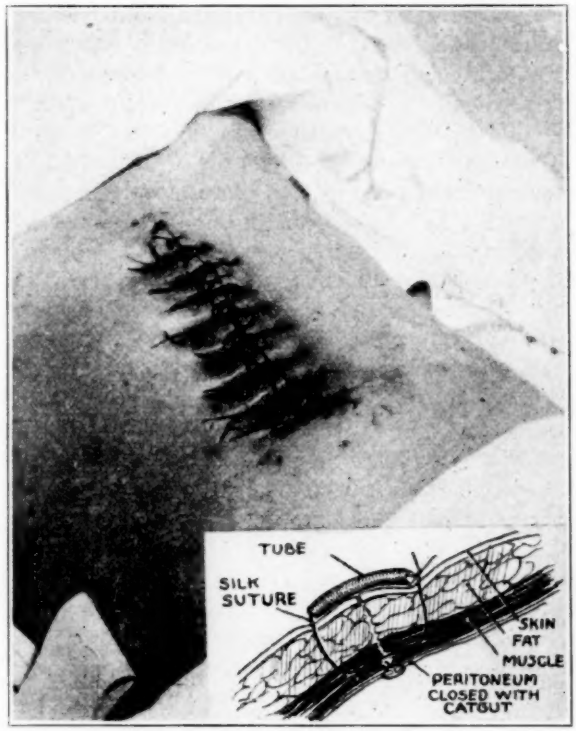


Fig. 8. *Method of closure of abdominal wound. Closure is obtained by through-and-through sutures of heavy black silk; these are placed close to the wound edges and are close together. The peritoneum is approximated by a single layer of catgut. The through-and-through silk sutures do not penetrate the peritoneum. No other layer sutures are used.*

(FHL*), we have been able to do very high, even total gastrectomies†, without spilling the gastric or esophageal contents and without contamination.

While some of the other surgeons in the clinic occasionally anastomose the jejunum to the cut end of the stomach posterior to the transverse colon, we have largely given this up for the past three years, using in every case the Hoffmeister type of end-to-side anastomosis with a long loop of jejunum carried up in front of and over the transverse colon. With this type of antecolic Hoffmeister anastomosis

*Lahey, F. H.: Waterproof laparotomy pad of gauze and cellophane. J. A. M. A. **104**:1990, 1935.

†Four successful total gastrectomies have now been done in the clinic, the jejunum being anastomosed directly to the open end of the esophagus.

there have been, at least in our own hands, fewer cases of obstruction in the jejunal loops, and gastric drainage has been established more quickly and more completely.

After giving all types of gastric resection a trial, we are definitely convinced that the most satisfactory procedure is the Hoffmeister type of high gastric resection done without clamps and coupled with a long antecolic loop. We have not employed enteroenterostomy in the antecolic loop.

Concerning the type of suture material, we have decided convictions. After employing catgut sutures in all layers, we have become assured that a serous outside layer of interrupted silk sutures is safer than catgut, and likewise that interrupted silk sutures in the outside layer of the suture line are safer than the continuous suture.

One of the most important steps in the operation of subtotal gastrectomy is the closure of the abdominal wall. We have been through a number of disturbing situations which were related to this part of the operation. Early in our experiences there were by far too many wound infections and partial and complete wound ruptures following standardized layer suture. For the last three years we have employed only mass through-and-through sutures placed very close to the wound edges and very close together. For a year we used no catgut sutures whatever, but at present we use a single layer of catgut to close the peritoneum. Other than this, only through-and-through sutures of silk have been employed (Fig. 8). Care must be exercised not to tie these too tightly. Nothing has been done to improve the condition of the wounds in the high gastric resections more than giving up layer sutures. The through-and-through silk sutures are left in the wound for fourteen days, and the end results as related to wound hernia and soundness of healing appear to be just as good as, if not better than, those in wounds which were closed in layers with catgut.

SUMMARY AND CONCLUSIONS

No patient with peptic ulcer should be considered to be in need of immediate surgery. Failure to obtain relief of ulcer symptoms by a good medical regime indicates the necessity for surgical treatment. The various indications for surgery are discussed in detail.

The seriousness of hemorrhage from peptic ulcer is emphasized. Two types of massive hemorrhage are described and a method of surgical management of bleeding ulcer is presented.

The advantages of subtotal gastrectomy over the more conservative surgical procedures, such as gastroenterostomy, are considered. Subtotal gastrectomy has resulted in the most complete relief of ulcer symptoms, the lowest percentage of recurrent ulcers, and the lowest values in gastric acidity. Gastroenterostomy is reserved as a method of choice for those patients whose condition does not permit the risk of a more radical procedure.

The various methods of subtotal gastrectomy are discussed briefly and illustrated. A modified Hoffmeister technic is described, and the advantages of the method are outlined. Certain technical details of the operation are presented.

Subtotal gastrectomy has been performed upon 130 patients with peptic ulcer with a mortality of 18 per cent of the surviving cases, 84 per cent have shown excellent results, while in 9 per cent they may be classified as fair. Recurrent ulcer has occurred in 7 per cent of these cases.

605 Commonwealth Avenue.

CHRONIC NONTUBERCULOUS BASAL LUNG DISEASE IN SCHOOL CHILDREN

PHILIP E. SARTWELL, M.D.*

BOSTON

THE Chadwick Clinic is an itinerant clinic organized for the prevention and early diagnosis of tuberculosis in the Massachusetts schools. The method of case finding used is as follows: a Pirquet test is done on all the pupils of a school for whom parental consent is given; the reactors are x-rayed, and only those children whose x-rays show disease are investigated further. In addition, some children have been examined because of contact with tuberculosis, malnutrition or history of cough. The commonest condition found is of course childhood-type (first-infection) tuberculosis. Children who show signs of pulmonary disease are given annual re-examinations, usually for several years. More than 100,000 children have been x-rayed since the organization of the clinic in 1924.

Numerous nontuberculous conditions have naturally been observed in the course of this work. They include pulmonary congestion, secondary to heart disease; acute pneumonic consolidations; emphysema due to asthma; and other less frequent diseases, including a few cases of cystic disease of the lungs. In each instance tuberculosis has been excluded with reasonable care, with sputum examinations whenever indicated.

This paper deals with 53 basal nontuberculous lesions which have persisted over a period of from two to twelve years. Lesions of the right middle lobe are included as basal lesions since in postero-anterior exposures they appear just above the level of the diaphragm, and we unfortunately lack lateral films, without which they cannot be distinguished from lesions of the right lower lobe. All the children studied were in sufficiently good health to be attending school. In most instances lipiodol studies, bronchoscopy and other special diagnostic tests could not be obtained; however, a diagnosis can usually be made from serial films together with medical history and symptoms, if the x-ray appearance conforms to that to be described. Whenever possible and necessary the patients were referred to a clinic interested in the appropriate conditions; 8 children were handled in this way, and in all the Chadwick Clinic's diagnosis was confirmed. These 53 cases are all believed to have bronchiectasis, atelectasis, or combinations of the two pathologic states. The only other condition likely to be confused with these is congenital cystic disease of the lungs, which may be represented in a few cases classified as bronchiectasis. Table 1 gives the classification and distribution of lesions.

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CLASSIFICATION

Atelectasis. Group A, numbering 12 cases, consists of children with a sharply defined triangular shadow having its base formed by the diaphragm, its vertical side formed by the lateral border of the spinal column, and its hypotenuse running from some point on the diaphragm up to the hilum. The area enclosed by these margins is of varying density, but usually much less radiable than the surrounding lung; it is mottled or solid, depending upon the amount of air present in the collapsed lobe. Confirmatory features often demonstrable by x-ray are shifting of the mediastinal structures to the side involved, emphysema of part or all the remaining lung tissue on the collapsed side and occasionally retraction of the ribs with narrowing of the interspaces. These triangular shadows were first identified with lobar atelectasis by several authors in 1925. Their interpretation has been clarified more recently by a number of writers, including Boyd,[1] Ellis,[2] Findlay[3] and Richards.[4] One of the largest carefully studied groups, consisting of 50 cases, was reported by Anspach[5] in 1934. It has been claimed that the same shadow can be produced by mediastinal pleurisy and by pneumonia, but the former is exceedingly rare while the latter is transient and easily ruled out. A streaky shadow in the cardiophrenic angle, which is generally due to fibrosis or bronchiectasis, should not be confused with the clear-cut triangular pattern described above.

Some writers think that lobar collapse usually occurs in an anomalous or accessory lobe; the majority feel that it occurs in anatomically normal lungs. There is also dispute as to the relation of

Table 1. *Duration of Study, and Results.*

	GROUP A ATELECTASIS	GROUP B BRONCHIECTASIS	GROUP C RALES ONLY
Number of cases			
Left	0	18	3
Right	11	10	1
Bilateral	1	13	8
Totals	12	41	12
Average age when first seen	9.3	11.8	9.3
Average number of years observed	4.2	4.0	7.5
Person years	51	166	90
Results			
Recovered	2	1	—
Improved	6	6	—
Unchanged	4	25	12
Progressed	0	8	—
Died	0	2	—

the process to bronchiectasis. It is thought by some that atelectasis is an outcome of bronchiectasis, through bronchial obstruction by fibrosis or secretions; others believe that lobar collapse may occur first but that bronchial dilatation necessarily follows at once; and still others feel that the atelectasis may exist uncomplicated for some time. Warner and Graham,[6] and Kourilsky and Anglade,[7] have succeeded in producing a similar triangular shadow in dogs by occlusion of the bronchus to a lower lobe; the latter experimenters report that the collapse may be maintained for a period of weeks or months without secondary changes if it was aseptically produced, and that upon removal of the occluding ligature the lung returns to an apparently normal state at once, without x-ray evidence of fibrosis or bronchial dilatation.

Bronchiectasis. Group B consists of 41 children believed to have bronchiectasis. Typical x-ray findings in this group are haziness, coarse mottling, or irregular linear markings along the lower portion of the bronchial tree, often extending down to the diaphragm and sometimes out to the lateral lung margin. Frequently the costophrenic angle is obscured, and occasionally diaphragmatic adhesions are seen. Of the 41 cases, 18 were left-sided, 10 right-sided, and 13 bilateral. Undoubtedly in the selection of cases some left-sided lesions were overlooked because they lay behind the heart. The predominance of left-sided lesions has been repeatedly noted by others.

Among the best recent investigations of bronchiectasis are those of Fletcher,[8] Wyllie,[9] Warner[10] and Ballon, Singer and Graham.[11] This condition is also thought by some to be due frequently to congenital factors such as accessory lobes and malformations of the bronchi; others find it possible to trace its onset to inhalation of foreign bodies or to diseases of childhood which have weakened the bronchial walls. At any rate, most cases have their onset during the first decade. It is not generally recognized that the classical picture of an emaciated person with clubbed fingers, foul breath, dyspnea and harassing productive cough is an end stage comparable to far-advanced tuberculosis, and that the condition can exist for years without symptoms other than perhaps slight intermittent cough, as in minimal tuberculosis. Symptoms and signs are dependent upon at least two factors: the extent and degree of dilatation of the bronchial walls, and the type of bacterial flora present. The expectoration of large amounts of offensive sputum generally accompanies large bronchiectatic cavities that serve as "septic tanks" for the accumulation and breaking down of bronchial secretions.

Miscellaneous. Group C consists of 12 children followed for a number of years who had basal rales heard in all or nearly all examinations, and a history of chronic cough and expectoration, but no definitely abnormal x-ray, although most of them show some accentuation of the descending bronchial markings. Without lipiodol it cannot be ascertained what if any is the nature of the lesions in these cases, but as they were observed for an average period of over seven years, they were included for comparison with the foregoing groups.

PERIOD OF OBSERVATION

Table 1 also gives the average age at which children came under observation, and the length of time that they remained under observation. The average duration of observation for the entire group was 4.7 years. In most cases the age of the child at the onset of symptoms could not be determined accurately, but in 15 children of Group B it averaged 7.7 years. In these same cases, the average number of years that symptoms had existed up to the end of the study was 7.9 years.

ETIOLOGY

Etiologic factors were also difficult to define. Pertussis and pneumonia were the only diseases described in more than one instance as marking the onset of cough. Only 1 child was proved to have a foreign body as the cause. Childhood-type tuberculosis was found in 10 of the 65 cases, but the method of selection of Chadwick Clinic children may account for this frequency. One child in Group A and 1 in Group B had massive calcified paratracheal nodes on the same side as the basal lesion, but these were too high to have obstructed the bronchus to the lower or middle lobe. The other 8 had the ordinary "primary complex" consisting of a calcified nodule in the lung with calcifications in the hilum. Jones and Cournand[12] present 4 cases of atelectasis and bronchiectasis which they claim were at least partly due to enlarged hilum glands. Wallgren[13] is of the opinion that bronchiectasis occasionally develops in an area previously affected by childhood-type tuberculosis. It is quite possible that in some of our cases enlarged nodes resulting from tuberculosis, bronchopneumonia or pertussis may have constricted the bronchi long enough to leave permanent lesions, without themselves remaining roentgenologically demonstrable. There is no proof of this, however. The study unfortunately gives no clue as to the causative agent in most cases.

SIGNS AND SYMPTOMS

Clinical features of the three groups are presented in Table 2. In Groups A and B there was

often a history of chronic cough and expectoration or of frequent chest colds; sometimes there had been repeated attacks of what was termed "pneumonia"; coarse crepitant rales might be heard at one or both bases, or sometimes throughout the lungs, often being more widespread than the disease as indicated by x-ray.

There were no striking differences in symptomatology between the two groups. In only 1 case in Group B was the disease classified as severe; the patient was a girl twelve years old with an extensive right-sided flocculent shadow and also some involvement of the left lung. She had clubbed fingers and profuse foul sputum, both of which are seldom found in these children; she was also emaciated and showed signs of sepsis. In all three groups, sinus disease was a marked feature of only

Table 2. *Clinical Findings.*

	GROUP A	GROUP B	GROUP C
Total cases	12	41	12
Cough and sputum:			
Absent	1	3	0
Intermittent	10	26	9
Constant	1	12	3
Basal rales:			
Absent	4	2	0
Intermittent	6	14	7
Constant	2	25	5
15% or more underweight	3	15	2

4 cases; symptoms and signs of asthma were obtained in 3; hemoptysis had occurred in 2. Most of the parents were unaware that their children had anything worse than a tendency to colds and "bronchial trouble."

PROGNOSIS

Investigators differ widely as to the prognosis in both types of disease. Findlay[3] cites 3 cases having both triangular shadows and slight bronchial dilatation which cleared up entirely; Ellis[2] describes 8 cases with both conditions, most of which remained stationary; the 14 cases reported by Boyd[1] were all progressive; and Anspach's[5] 50 cases were quite variable in outcome. Wyllie[9] thinks that the collapse is usually permanent. No author seems to have presented facts on collapse uncomplicated by bronchiectasis. Bronchiectasis without the triangular shadow is considered by Findlay and Graham.[14] In their series of 32 proved cases, 12 died and 14 of the remaining ones were under supervision from three to six years. Three of them, all with only slight changes, recovered; 3 remained stationary; and 8 became worse. In general, the prognosis is considered grave in bronchiectasis; but Ballon, Singer and Graham,[11] who have made a careful study of the problem, do not agree that all types "steadily get worse." They state that occasional recoveries are possible and that the disease may exist for many years without attracting attention clinically, especially in children. The only finding which seems to them to indicate a poor prognosis in children is displacement of the mediastinal structures to the affected side. They emphasize that there is very little information on the result of untreated bronchiectasis, and that a knowledge of what types are progressive is of great importance to the surgeon.

An attempt has been made in Table 1 to evaluate the outcome of these cases on the basis of x-ray changes alone; hence those with negative films are listed as unchanged. The most striking finding was that the outcome was decidedly better in Group A than in Group B. No case of atelectasis showed progression by x-ray, while 2 were considered as recovered and 6 as improved. In contrast,

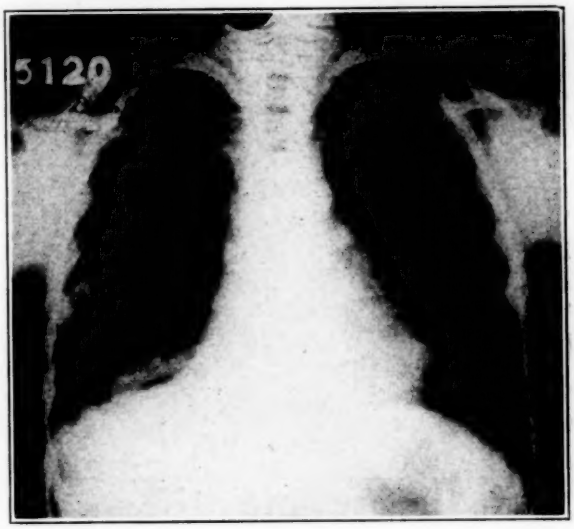

Fig. 1*a*.

8 children in group B showed an increase of lesions and 2 died, so that about 25 per cent may be said to have undergone downward progression. On the other hand, no such rapid evolution was observed as is common with pulmonary tuberculosis in this age group.

In several cases of atelectasis the shadow became larger and less dense, indicating partial expansion; in 1 it disappeared, leaving only a few linear markings in the cardiophrenic angle, as shown in the following case history.

R. M., a female, was first examined and x-rayed in 1932 at the age of 5 on account of contact with a tuberculous brother. There was a story of rather frequent chest colds and cough. Nutrition was normal. The x-ray showed a dense triangular shadow at the right base (Fig. 1*a*). Auscultation of the chest elicited crepitant rales over the lower right lung. One year later the shadow had disappeared, leaving slight streaking in the cardiophrenic angle (Fig. 1*b*). Physical findings were negative and the cough had cleared up. Four subsequent examinations have given substantially the same findings.

Another child had a similar faint striation in the right lower lung field on the first two films; the third film showed a mottled triangular shadow with a straight, sharply defined hypotenuse extending from the hilum to the costophrenic angle; in the fourth film, taken a year later, this had disappeared, leaving only what was seen originally. This child suffered each winter from colds with cough and expectoration; there were no abnormal physical findings except poor nutrition. Finally, 1 child had a dense triangular shadow at the right base when first examined; the next four films cov-

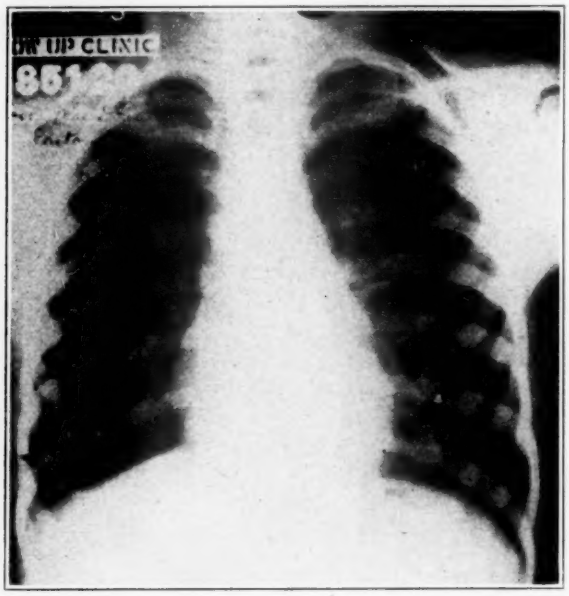

Fig. 1*b*.

ering a period of five years showed no such shadow, but in its site were very prominent bronchial markings; the last film, taken six years after the first, showed recurrence of the dense shadow. Examination of this child elicited inconstant rales at the right base. Thus we have seen 12 triangular shadows, of which 1 cleared up without recurrence during the study, 1 cleared up but recurred six years later, and 1 appeared during the period of observation but was absent the next year.

In Group B, possible prognostic factors were scrutinized more closely. Of the 41 cases, 29 had been under observation for three years and more; it was felt that a study of these would yield more accurate information than a study of the larger group. In Table 3, these 29 cases are analyzed by outcome and by age, weight, location of lesion and whether or not the mediastinal structures were displaced. Unfortunately, no definite conclusions can be drawn from these figures because of the variance in periods of observation. For example, those with right-sided disease had a less favorable outcome, but they happened to be kept under observation nearly twice as long as the left-sided cases and therefore had a greater opportunity for

Table 3. *Outcome in 29 Group B Cases (Observed Three Years and Over).*

	RECOVERED	IMPROVED	UNCHANGED	PROGRESSED	DIED	AVERAGE NUMBER OF YEARS OBSERVED
First seen up to age of 10	1	2	7	3		4.6
First seen over age of 10		3	10	2	1	5.4
Normal weight		4	10	2		5.1
More than 15% underweight	1	1	7	3	1	5.0
Lesion at left base	1	4	6	2		4.5
Lesion at right base			6	1	1	7.5
Lesion at both bases		1	5	2		5.1
Without shift of mediastinum		4	12	3		4.8
With shift of mediastinum	1	1	5	2	1	5.3

extension of the disease. One recovery was listed because of disappearance of the basal shadow; of course only bronchography would permit one to say this with certainty. There were 2 deaths in the group of 41, neither of which can be proved

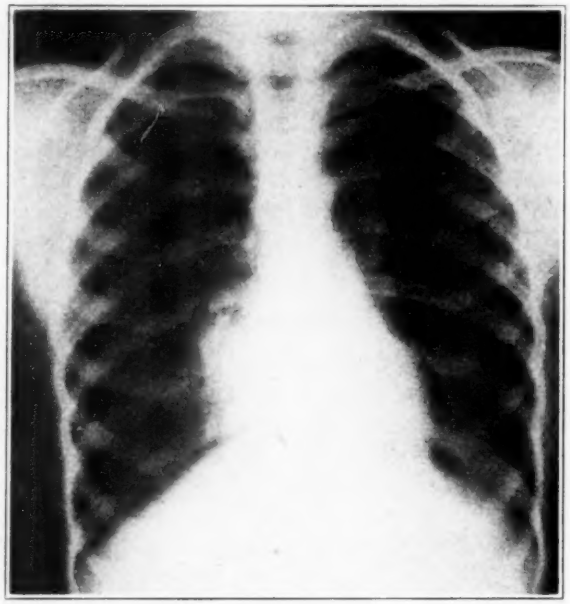

Fig. 2*a*.

to be due to the chronic process; however, both had pneumonia, and it is likely that bronchiectasis was at least a predisposing factor. The case history of one of these is as follows:

R. F., a female, was first examined in 1926 at the age of 11 on account of malnutrition, and remained under observation for 10 years, with x-rays in 1926, 1930, 1933, 1934, 1935 and 1936. She was free from symptoms during this period, except for frequent colds. She had eight chest examinations; each time coarse crepitant rales were heard at the bases of both lungs. When first seen she was 15 lb. (20 per cent) underweight; when last seen she was only 3 lb. below average and in good general condition. No physical abnormalities were noted except the rales. This

girl returned each year in order to be examined; she declined, however, to go to a hospital for bronchoscopy. Nine months after the last examination, at the age of 22, she died of what was reported to be "ether-inhalation pneumonia" following childbirth. As no autopsy was performed, it is impossible to say whether her death was related to her chronic pulmonary lesion. Figure 2*a* is a reproduction of the 1926 film; all subsequent films showed a small mottled shadow in the right lower lung field adjacent to the cardiac border. The only change noted was slight increase in the size of the shadow. Figure 2*b* shows the 1936 film.

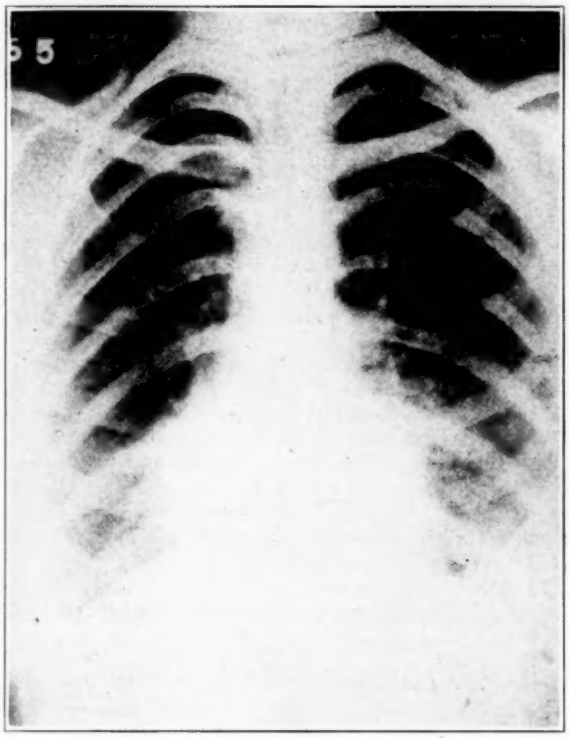

Fig. 2*b*.

There is less to be said concerning Group C. These children seemed to do well while under the supervision of the clinic. Some of them may have simply had recurrent bronchitis; others may present cases of bronchiectasis.

COMMENT

Most of the basal lesions remained stationary while under observation in contradistinction to pulmonary tuberculosis in childhood which is a progressive disease. We are inclined, however, to view bronchiectasis with a good deal of pessimism. Is this justified? Probably these results differ from previous ones in part because the children were seen early, long before they would be led to consult a physician voluntarily. This of course does not mean that they should be denied the benefit of surgery when it is indicated. They are better operative risks than advanced cases, and in waiting too long there is danger of the disease's spreading until operation is impossible; the tendency to pneumonia is another argument for intervention. When symptoms have become marked, life is most unpleasant for the victim and radical procedures should not be withheld as a last resort. Nothing short of lobectomy has thus far proved to be of much value; several of the children in this group were subjected to it with excellent results.

CONCLUSIONS

1. Chronic nontuberculous basal lung conditions in 65 school children were observed by x-ray over a period of years and classified on the basis of x-ray evidence and physical examination as atelectasis, bronchiectasis and basal lesions with negative x-ray findings.

2. Lobar atelectasis appeared to be an unstable condition with a more favorable outcome than bronchiectasis.

3. Basal lesions believed to be bronchiectasis tended to produce few symptoms or signs and to remain stationary while under observation. Factors modifying the outcome were not noted.

The author is greatly indebted to Dr. David Zacks, chief of the Chadwick Clinic, for his assistance in preparing this paper.

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SPERMATIC ABNORMALITIES

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THE ability of a germinal cell to unite with that of the opposite sex and reproduce the characteristics of its antecedents is the fundamental proof of its health. It is a matter customarily proved in retrospect; and highly valuable as an advance knowledge of the cellular function may be, various tests aimed at the appraisal of spermatic health have been quite inadequate. The nucleus of the spermatozoon is its most important functional element; yet in most semen examinations its study is inadvertently avoided. In an attempt to throw some light upon this subject we have been working on methods by which the morphologic condition of the spermatozoon may be more readily and quickly determined, and by which the relation between the morphology of these cells and their functional probabilities established. We[1] have already described three different methods of staining spermatozoa which, because of the rapidity of application together with their differential properties, particularly suit them for use in the office examination of semen samples. A résumé follows:

A semen smear is prepared by placing a drop of semen on the end of a microscope slide and pulling it across with a second slide held at an angle of 45° to the first, as is done in making a blood smear. This smear is dried in the air, fixed with moderate heat, treated with 0.5 per cent chlorozene† solution for from 2 to 4 minutes to remove the mucus film which overlies the spermatozoa, and washed gently with distilled water and then with 95 per cent alcohol.

Method I. Crystal Violet and Rose Bengal.

1. Cover film with 0.25 per cent aqueous solution of crystal (gentian) violet for from 2 to 3 minutes.
2. Wash with water.
3. Decolorize with 95 per cent alcohol for from ½ to 2 minutes.
4. Wash with distilled water.
5. Counterstain with 1 per cent rose bengal (aqueous) for 8 seconds.
6. Wash in water and examine under the microscope. If the spermatozoa have not taken up sufficient rose bengal to impart a distinct reddish color to the acrosome and nuclear membrane, repeat the staining interval with the rose bengal until this is accomplished. Care should be taken not to overstain with the rose bengal, since if this is done the contrast between the nucleus and the acrosome will be lost.
7. Dry and mount in neutral Canada balsam. Examine under an oil-immersion lens.

†Paratoluenesodium sulfonchloramide.

*Junior assistant physician, Springfield Hospital.

Method II. Wollschwarz, Methylene Blue and Rose Bengal.

1. Stain in a 1 per cent aqueous solution of Wollschwarz for 5 minutes, as follows:

Prepare three solutions:

	a	*b*	*c*
Wollschwarz 1 per cent (aqueous)	4.0 cc.	4.0 cc.	4.0 cc.
Sulfuric acid 2 per cent	0.025 "	0.05 "	0.075 "

The smear on the microscopic slide is marked off into three divisions with a glass marking pencil, and the solutions of stain having the different concentrations of sulfuric acid are applied respectively to each of the divisions. Dilutions *a* and *c* may be omitted.

2. Wash with water.
3. Counterstain 6 or 8 seconds with Loeffler's methylene blue which has been diluted with 15 parts of water. This acts as a mordant to the Wollschwarz, serving to fix it in the nucleus. It imparts a rather dull greenish hue to the otherwise yellowish-stained nucleus.
4. Wash with distilled water.
5. Counterstain with 1 per cent aqueous rose bengal for about 6 seconds, or until sufficient rose bengal is set in the acrosome, nuclear and cell membranes to give the desired contrasts. Examine slide after each application of stain so as to guide its intensity.
6. Wash with distilled water, dry, mount in neutral Canada balsam and apply coverslip; or examine without mounting.

Method III. Carbolfuchsin, Eosin B and Methylene Blue.

Prepare the following staining solutions:

Stain 1

Saturated alcoholic solution of eosin (bluish)	1.0 cc.
Ziehl-Nielson carbolfuchsin	2.0 "
Alcohol, 95 per cent	1.0 "

Mix the eosin and carbolfuchsin solutions together in a dry watch glass. Immediately on mixing, an insoluble precipitate and a metallic film form. Filter the mixture and to the filtrate add the 1 cc. of 95 per cent alcohol.

Stain 2

Loeffler's methylene blue	1 part
Distilled water	6-8 parts

1. Apply Stain 1 for 2 minutes to the smear of semen.
2. Wash film gently with distilled water. This is best done by immersing it in a basin.
3. Counterstain with Stain 2 for from 4 to 8 seconds.
4. Wash slide in distilled water, and dry.

The present discussion is concerned with commonly observed spermatic abnormalities, and particularly with sperm classification as a means of appraising the health and functional probabilities of sperm populations. It is hoped that this may

provide a more reliable means for the determination of spermatic health.

In various species, including homo, equinus and bovinus, the relation of spermatic abnormalities to nonfertility has been recognized. Cary[2] in 1916 indicated the importance of determining the incidence of abnormal spermatozoa in studies of human fertility. In 1920, Widakowich[3] reported a higher incidence of abnormal spermia in the semen of syphilitics than in that of healthy men. Williams[4] in 1920 reported a high incidence of abnormal spermatozoa in the semen of sterile bulls. Williams and Savage,[5] and Williams, Savage and Fowler,[6] as a result of an extensive study of sterility in the bovine species, pointed out that sterility and occasionally abortions among cows may often be attributed to defective spermatozoa, and that the morphology of the sperm head furnishes the best single criterion for estimating the effectiveness of these cells for reproduction. These observations were confirmed by exhaustive studies by Lagerlöf.[7] Similar observations were made by Savage, Williams and Fowler[8] in relation to the equine species. Moench[9, 10, 11] in 1927 was the first to report comprehensive observations on the relation of spermatic abnormalities to reproduction in man. Similar observations have been made by Cary,[12] Belding,[13] Vose[14] and others.

The semen samples used in this study were derived from several groups: proved fertile males, males of infertile matings, a group of schizophrenics, and a small group from apparently normal men whose fertility had not been clinically classified. The normality of a sperm population is largely determined by the ratio and type of spermatic abnormalities present; as a corollary to this, a biometric study of variations in size frequently furnishes further substantial proof of significant disturbance in spermatogenesis. Moench[15] states: "Even counts below 20 per cent abnormal heads may denote sterility, if narrow and tapering or sickle-shaped heads are marked and total 8 to 10 per cent or more." Moench further concludes as a result of his extensive study of infertility cases that a coefficient of variability in excess of 11.5 indicates disturbed spermatogenesis and consequently an abnormal condition of the sperm population. Because, however, of frequent matings in the human family, it is to be expected that occasional conceptions should occur in cases where the coefficient of variation exceeds 11.5, and in those cases presenting a somewhat abnormally high ratio of pathologic spermatozoa.

Of the 38 cases which we studied, only 4 had coefficients of variation which fell within the normal limits as established by Moench. The highest coefficients of variation were encountered in the group of semen samples from schizophrenics, and this coincides with our observation of a very high incidence of pathologic spermatozoa in this group. The variety of cases presented serves to illustrate the marked variation of spermatic pictures of different individuals.

In estimating spermatic health, various factors, such as the density of the spermatozoa in the seminal fluid, the total number of spermatozoa ejaculated, the physical and chemical condition of the seminal fluid and the motility of the spermatozoa, all require consideration, but collectively this information means little without a knowledge of the morphologic condition of the germinal cells.

We feel that an examination of a semen sample based on an analysis of spermatic defects provides in itself the most reliable and valuable information

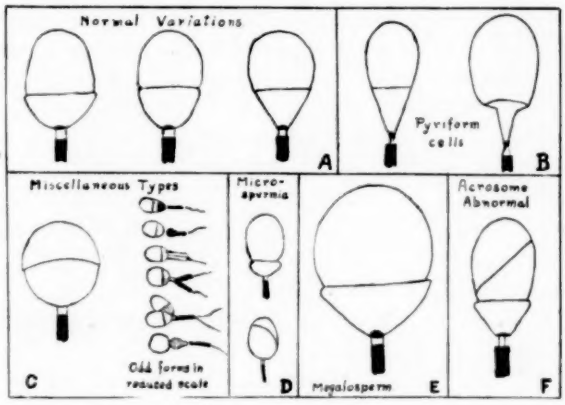


Fig. 1. *Diagram showing the commoner structural types of spermatozoa used in classifying populations of spermatozoa.*

for the determination of the health of a sperm population. Because such analysis is dependent largely upon objective findings, comparable results may be anticipated by different observers provided a uniform method of examination is adopted. A type of staining should be employed that will give clear detail under at least 1000 diameters magnification,[1] thus allowing the spermatozoa of a given population to be examined minutely and classified in a limited number of groups, based on their morphologic characteristics. For practical purposes all the cells may be classified in not more than six groups: (a) normal, (b) pyriform heads, (c) miscellaneous types, (d) microspermia, (e) megalospermia, and (f) abnormalities of the acrosome (Fig. 1). Familiarity with these various morphologic types is an essential step in appraising the health of a sperm population and thereby its potentialities. It must be primarily borne in mind that healthy semen samples always contain some abnormal spermatozoa, and that unless there is a very marked oligospermia it is rare to find a semen

sample so badly diseased as to contain no normal-appearing cells.

The composite spermatic picture resulting from differential counts of different semen specimens is presented in the clinical group averages given in Table 1. The average of the abnormal type

Table 1. *Averages of Differentials Expressed as Cells per Thousand.*

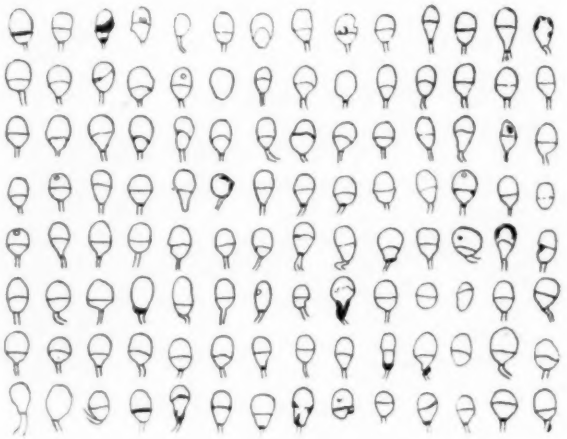
		Classification						
	No. Cases	A *Normal*	B *Pyriform*	C *Miscellaneous*	D *Microsperma*	E *Megalosperma*	F *Abnormal Acrosomes*	Per Cent Abnormal
Fertile matings	11	732.9	56.0	36.2	131.7	25.8	17.3	26.7
Infertile matings	5	607.2	80.5	41.2	190.7	29.7	50.4	39.3
Unclassified	7	623.8	84.2	43.7	204.8	19.4	26.9	37.6
Schizophrenics	15	519.0	96.4	63.4	232.0	30.1	35.6	48.1

cells in the clinically fertile group is somewhat higher than is to be expected in the usual normal healthy individual, since this group contains several individuals with an excessive number of abnormal-type cells who were once proved fertile, although not in the past few years. Their fertility at the time of sampling is questionable. Widespread morphologic alterations of the spermatozoa signify an even more widespread injury to spermatogenesis, and in consequence a functional impairment out of all proportion to the observed anomalies.

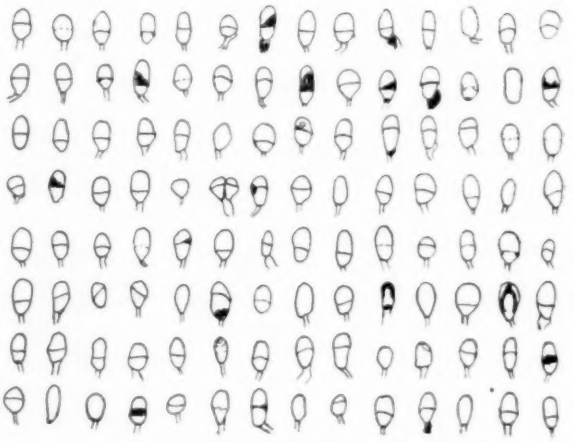
Since all sperm populations contain members of different sizes and shapes, and even those within normal limits vary considerably, it is necessary to fix firmly in mind the normal types and normal variations as contrasted to the abnormal, in order that a satisfactory classification of a sperm population may be made. The size is more accurately determined by actual measurement; yet in actual practice, with the use of the same magnification for each examination, it is possible to differentiate the cells of normal and abnormal size with sufficient accuracy. A variation of the longitudinal diameter in excess of about one third its estimated mean should be considered abnormal. Since the mean diameters of spermatozoa from different normal individuals vary quite markedly, it is best to consider the normally shaped cells of most frequent occurrence as of normal size for the specimen under consideration (Fig. 2).

MORPHOLOGY OF NORMAL SPERMATOZOA

In a former paper we[1] described in detail the structural characteristics of normal mature spermatozoa as observed in stained preparations. They are roughly oval in contour. Some are of an almost perfect oval shape, others have a particularly broad obtuse base, and still others have a markedly tapered posterior extremity of the head, conforming to a triangular-shaped nucleus. In different but apparently normal individuals, any one of the



A. NORMAL.



B. ABNORMAL.

Fig. 2. *A shows the tracings of spermatozoa of an essentially normal population (normal 79, pyriform 16, unclassified 3, microsperms 10, megalosperms 4, abnormal acrosome 0; total abnormal 33). Note fullness of contour and uniformity of size in contrast to B, which shows the tracings of a decidedly pathologic sperm population (normal 54, pyriform 25, unclassified 5, microsperms 24, megalosperms 1, abnormal acrosome 3; total abnormal 58). In our experience, the spermatozoa from the healthier and highly fertile individuals are even more uniform in size and contour than represented in A.*

three types may predominate. For this reason it is best to classify these normal variations in a single group (Figs. 3 and 4).

ABNORMAL SPERMATOZOA

Consideration of abnormal types of spermatozoa is here limited to those encountered with the greatest frequency. Only too often an observer loses sight of the fact that he is dealing with an extremely large population. As a result, he attaches undue significance to some rare, bizarre type of

cell the incidence of which is too low to affect by any possibility the functional probabilities of the sperm population as a whole (Figs. 5, 6 and 7).

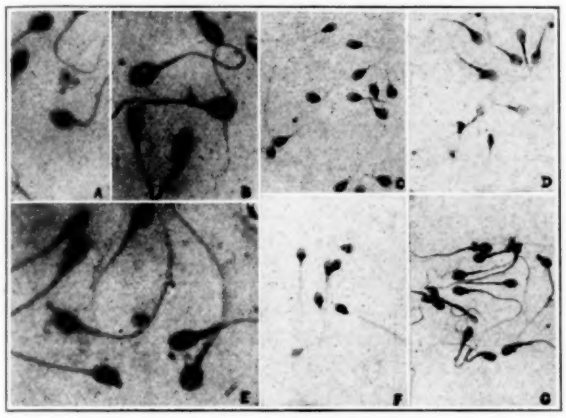


Fig. 3. *Groups of spermatozoa from individuals with histories of fertile matings. Note uniformity in size and shape of the cells, most of which may be classified as normal. A, B, E, 800×; C, D, F, G, 400×; Wollschwarz stain. (Cases 7, 26, 28 and 34.)*

Most abnormal spermatozoa are either of pyriform shape or below normal in size. In both types there is marked alteration in the size or shape of

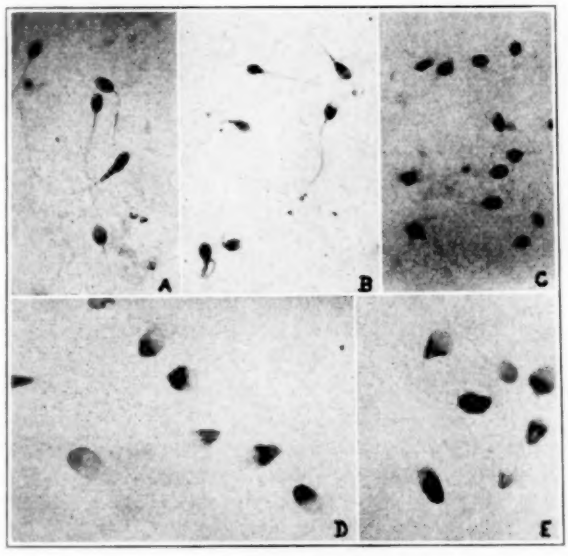


Fig. 4. *Groups of spermatozoa from fertile men. Considerable variability of minor degree is present, but insufficient to interfere seriously with function. Strikingly pathologic forms are infrequent. The apparent absence of tails is due to the staining technic plus the use of light filters which render the appendages almost invisible. A, B, C, 550×; D, E, 1100×; Wollschwarz stain. (Cases 8 and 9.)*

the nucleus, or both. In the microsperm there is a marked diminution in the surface area of the acrosome — the cytoplasmic portion of the spermatozoon. A normal sperm population usually contains not more than 9 per cent pyriform cells, and according to our arbitrary standard by which a normal variation of about 30 per cent of the longitudinal diameter is permitted, we find that the semen from an apparently normally functioning

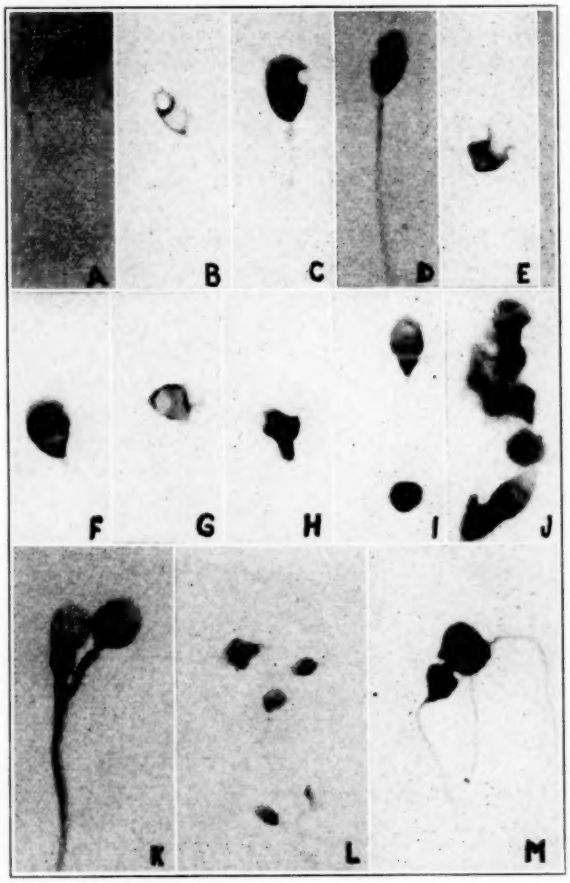


Fig. 5. *Miscellaneous spermatic anomalies. A-E, the metamorphosis of vacuoles in spermatozoa; large vacuoles may be observed in various stages of development. D and F, small vacuoles. G and H, abnormalities in the cup-like shell or so-called exoskeleton of the spermatozoon. I, a microsperm with no acrosome. J, pyriform spermatozoa. K, a normal and a pyriform spermatozoon, the latter with nucleus occupying only about one half of its cup-like shell; the interval representing the neck stands out best in the more normal spermatozoon; this interval is commonly obscured in the presence of markedly pathologic nuclei and with enlargements of the end knobs. L, a megalosperm with hypertrophied cup-like shell and enlarged anterior knob. M, a megalosperm with hypertrophied cup-like shell and enlarged end knob, a single nucleus with two pedunculated acrosomes. 900× and 1800×; Wollschwarz stain. (Cases 41, 42 and 8.)*

sperm population contains at the most not more than 12 per cent microspermia. We have perhaps been overcareful in designating certain cells as microspermia; yet this is of no consequence if the criterion as to what constitutes normal is uniform with different observers.

In a miscellaneous group we place various abnormal types which cannot readily be classified in the other groups. This group contains globular-shaped cells, those with doubling of the head, body or tail, and various other bizarre conformations. Rarely does this group consist of more than 4 per cent of the total population, and the incidence is usually not greatly increased in the more pathologic samples.

Megalosperms are encountered in many semen samples, but seldom in a ratio of over 5 per cent. They consist of two principal types, one simply an enlarged mature type of spermatozoon, and the other an extremely large cell with nucleus and cytoplasm poorly differentiated. The latter, which is frequently supplied with a poorly developed caudal appendage, is an immature cell with development presumably arrested in the spermatid stage.

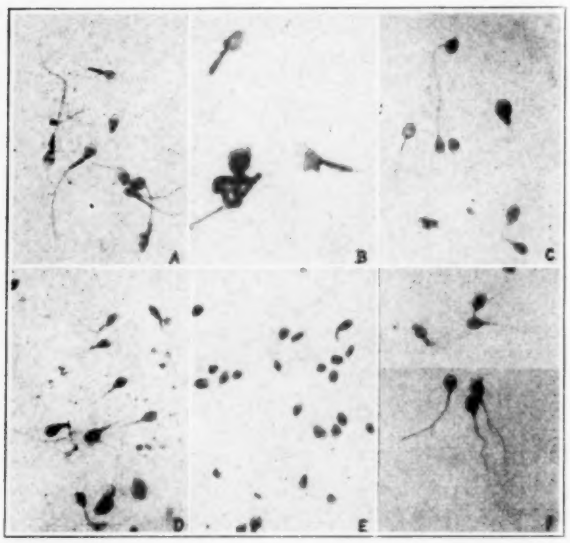


Fig. 6. *Spermatozoa from men with history of infertile matings. A and B, pyriform cells and microsperms abundant in this specimen; in B note microsperm with spiral filament about body (Case 3). C, abnormal ratio of nucleus and cytoplasm; the nucleus should occupy less than the posterior half end of the head; single megalosperm present (Case 5). D, pyriform cells and microsperms moderately abundant (Case 10). E, microsperms in ratio of 28.2 per cent, with marked reduction of acrosome in smaller cells; the larger cells shown are of essentially normal size, and in these the lighter-staining anterior area represents the position of the acrosome (Case 14). F, abundance of perfectly normal-appearing cells, suggesting an erroneous clinical classification, although the individual from whom this specimen was obtained was clinically reported sterile; many vacuolated cells were present in this specimen (Case 6). Stains: A and B, rosaniline; C, D, E and F, gentian violet, counterstained with rose bengal.*

Abnormalities of the acrosome are encountered in a great many specimens, but infrequently in a ratio in excess of 5 per cent, even in the more pathologic specimens. Ordinarily in the development of the spermatozoon the centrosomic material migrates posteriorly, and from it the tail arises in a similar manner to the cilia of somatic cells. At the same time the nucleus assumes a posterior position in the head, and the anterior aspect of the nucleus then becomes flattened to form a line transversely across the head, a little posterior to its geometric center. If spermatozoa are properly stained, it will often be found that the relation of acrosome to nucleus is altered. There may be too little or too much acrosome, or the acrosome may be laterally placed with respect to the nucleus. Some of these cells are of normal size; others should be classified as microsperms or megalosperms.

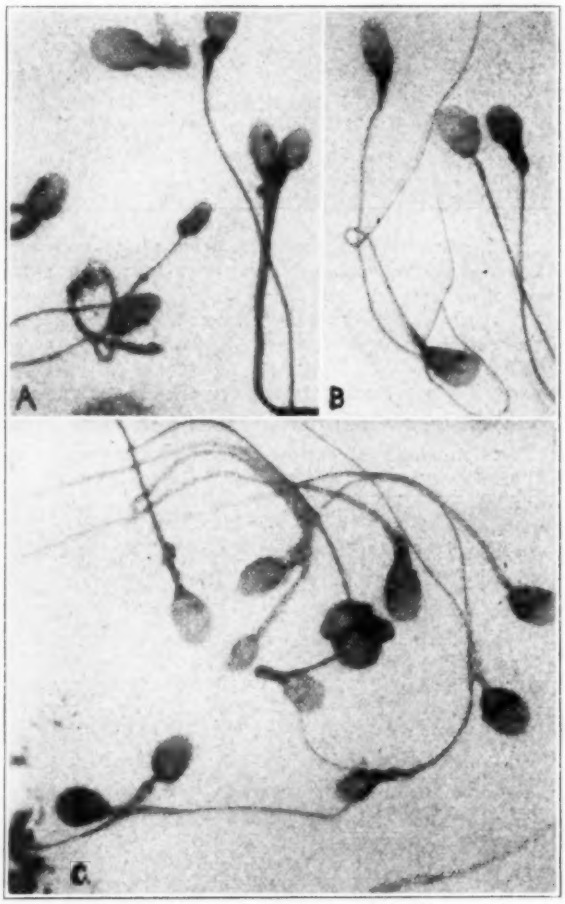


Fig. 7. *Pathologic spermatozoa from a schizophrenic. Many different pathologic types are present, such as pyriform cells and microspermia. Note one cell in B without acrosome, and with hypertrophy of end knobs. Normal cells occur only in ratio of 29.5 per cent. 1800×; Wollschwarz stain. (Case 38.)*

An interesting type of anomaly is the presence of vacuoles in the sperm heads, usually in the acrosome and lying close to the transverse nuclear line. These vacuoles have been observed in a frequency of as many as 33 per cent of the cells of a population, but in some specimens no vacuolated

cells are found. There seem to be two types of vacuoles, one of which measures 0.5 micron and the other about 2 micra. The latter often ruptures to the surface, causing a jagged rent in the cell wall laterally, just anterior to the nucleus; or, if it ruptures from the flat surface of the acrosome, it appears as a crater. We have no evidence that these vacuoles have functional significance (Fig. 5, *a-e*).

A normal semen sample contains a sperm population of tremendous numbers, ordinarily as many as 60,000 spermatozoa per cubic millimeter, and a single ejaculate may contain as many as half a billion cells. The members of this population differ in various attributes such as size, shape, motility, fertilizing power and ability to transmit normal or morbid anlage. Different sperm populations vary in functional effectiveness according to the number of healthy cells present. Naturally, this is materially affected not only by the ratio of abnormal cells but also by the total number of cells ejaculated. In the presence of oligospermia the number of effective cells becomes materially reduced and a high ratio of abnormal cells becomes increasingly significant. Because morphology is unaffected by various extrinsic factors, it becomes evident that a classification of a sperm population such as outlined is indispensable in a clinical study of spermatic function. Further, motility tests alone may give false evidence of health, because pathologic cells may be highly motile. We agree with Moench that a population of normal density containing not more than 20 per cent abnormal forms may be considered normal, but that this consideration should be tempered by the type of abnormalities present. Realization that there is a considerable variability in the structure of normal spermatozoa, and further that nuclear changes are apparently of great significance, will aid materially in deciding which spermatozoa should be considered abnormal, and whether a given sperm population should or should not be considered functionally unfit for propagation; yet unless it is possible to adopt a more uniform basis for analysis by different observers and to study the spermatic picture in different clinical groups, it will be difficult to arrive at a sound interpretation of spermatic disease in its various possible implications.

Inferentially, from the Mendelian law, we may assume that inherent functional attributes are distributed among the spermatozoa of a given sperm population in a constant ratio. On the basis of repeated examinations of semen samples, we know that individual characteristics tend to remain constant, both as to type of morphologic variations of the spermatozoa and as to the ratio of such cells in the population. Because of this, and because of the improbability of two different persons' presenting identical pictures in these respects, a careful examination may provide a means of identifying a semen sample as that of a given individual, and possibly point to significant hereditary tendencies.

SUMMARY

We have presented a system for the classifying of a population of spermatozoa on the basis of morphologic characteristics. Our aim is to provide a systematic method which will give comparable results in the hands of different observers, and thus permit a clearer appreciation of the relation of spermatic structure to function, whether in the realm of fertility studies or in the as yet unexplored field of abnormal hereditary tendencies.

Laboratory facilities were provided by the Medfield State Hospital, Medfield, Mass. The author is greatly indebted to H. D. Carpenter, of Fort Worth, Texas, for much valuable assistance on the laboratory work in connection with this paper.

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BENZEDRINE SULFATE IN THE TREATMENT OF SYNCOPE DUE TO A HYPERACTIVE CAROTID SINUS REFLEX

Report of Two Cases

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THE importance of the hyperactive carotid sinus reflex in the causation of syncope has lately been receiving deserved emphasis. Accounts of patients who possess a hypersensitive carotid sinus are available in many able reports which have appeared from time to time. Weiss and Baker[1] reported 15 cases, Ferris, Capps and Weiss[2] 32, Smith and Moersch[3, 4] 4 and later 31, Roskam[5] 1, and Missal and Crain[6] 1. A detailed study of the reflex has been published by Hering,[7] Heymans[8] and Ask-Upmark,[9] while Weiss and his colleagues[10] have expounded many of the intricacies of the mechanism of this fascinating reflex.

The carotid sinus is the bulbous dilatation at the bifurcation of the common carotid artery. In patients who possess a hypersensitive carotid sinus, such as described by Weiss,[10] Smith,[3] Ask-Upmark[9] and many others, stimulation of the sinus by pressure will often induce syncope or convulsions as well as other manifestations.

Hering,[7] Heymans,[8] Ask-Upmark[9] and many others have published much of the following information. The adventitial layer of the carotid sinus is equipped with specialized nervous receptors. From these receptors afferent impulses are carried to the medulla by branches of the intercarotid, glossopharyngeal, cervical sympathetic, vagus and hypoglossal nerves. Change in pressure within the sinus stimulates the receptors. Normally the arterial blood pressure maintains a relatively constant level within the sinus. An increase in pressure within the sinus will reflexly produce a decrease in blood pressure, cardiac rate and production of adrenine, while respiration and peristalsis are increased. Converse effects result from a decrease in intrasinal pressure. Normally the sinus, like the aortic depressor reflex, guards against sudden excessive increases in intra-arterial pressure by its depressor reflex. In patients with abnormally sensitive carotid sinus reflexes these depressor effects, often accompanied by syncope, result even when a slight or moderate increase in intrasinal pressure occurs.

Weiss and his colleagues have clearly differentiated three types of hypersensitive carotid sinus response, according to the efferent arc over which the impulses travel. These are (1) the vagal response with sinoauricular or auriculoventricular block and resultant asystole, (2) the depressor response with vasodilatation and hypotension and (3) the cerebral response with no significant change in cardiac rate or blood pressure.

The kind of response may be determined by appropriate stimulation of the sinus in the neck. Only one sinus should be stimulated at a time, however, in order to avoid fatal syncope. The patient should be standing, as the effects of a hypersensitive carotid sinus are often aborted when he is horizontal.

The two cases of hyperirritable carotid sinus syncope encountered by us were found to possess a depressor as well as a vagal element in the sinus response evoked. They were therefore placed upon ephedrine sulfate therapy, which Weiss and his associates[10] have demonstrated to be efficacious for the depressor and vagal types of response of sinus syncope. In the depressor type of hyperirritable carotid sinus, epinephrine or ephedrine aborts attacks by constricting the small blood vessels, thus abolishing vasodilatation and resultant syncope. In the vagal type of sinus response, these sympathomimetic drugs stimulate the ventricles directly. As a result, the latter assume an independent rhythm sufficiently rapid to prevent the syncope which would otherwise result from vagal heart block.

Although efficacious, the action of ephedrine proved short-lived. In order to secure more prolonged action it occurred to us to administer the new sympathomimetic drug, benzedrine (phenylisopropylamine).* The results proved satisfactory.

Case 1. Male, 24 years old. The physical examination was essentially negative. The chief complaint was convulsions. For the past 6 years the patient had had syncopal attacks occurring about six times monthly. During these attacks there were loss of consciousness and generalized convulsions. The attacks ceased within half a minute. There was no postsyncopal confusion. During the examination it was found that seizures could be induced by pressure with the fingers over the right carotid sinus. Pressure maintained in this way for 10 seconds caused a slowing of the pulse from 70 to 22, a decrease in blood pressure from 110/70 to 80/60, and a generalized convulsion, lasting but 6 seconds after the pressure was released.

Following the procedure set forth by Weiss,[10] atropine and then epinephrine was used in an attempt to abort induced attacks. Atropine sulfate (1/60 gr.) was administered intravenously and sinus pressure again instituted. Syncope occurred as before. Epinephrine (0.5 cc.) 1:1000 solution

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*Administered as benzedrine sulfate, supplied by Smith, Kline and French Laboratories of Philadelphia.

was then injected subcutaneously. Syncope could not be induced for over 4 hours. The following day ephedrine sulfate was used orally. Even in 1-gr. doses it aborted induced attacks for not more than from ½ to 1 hour. Twenty-four hours later benzedrine sulfate (20 mg.) was administered orally. Neither carotid sinus hypersensitivity nor syncope could be demonstrated for as long as 4 hours after the benzedrine. Thereafter this amount of benzedrine sulfate given three times daily prevented induced and spontaneous seizures during the interval through which medication was continued.

Case 2. Male, 57 years old. The physical examination was negative except for arteriosclerosis (Grade 2). The complaint was the occurrence of generalized convulsions three times monthly, each seizure lasting 2 minutes. During physical examination it was found that pressure over the right carotid sinus for 15 seconds caused the pulse to disappear and the blood pressure to fall from 108/80 to 60/?, whereupon unconsciousness and convulsions supervened. As in Case 1, atropine was ineffectual, whereas epinephrine was successful in preventing induced sinus syncope. Here, too, ephedrine sulfate given orally was effective for a relatively short time (½ hour), whereas 20 mg. of benzedrine sulfate prevented induced seizures for several hours. This dosage three times daily prevented spontaneous seizures during the interval through which it was administered.

SUMMARY

A brief review of the hyperactive carotid sinus reflex is presented, and its important relation to syncope as reflected in recent reports is pointed out.

Benzedrine sulfate was effective in preventing the depressor response and syncope in 2 patients with a hyperactive carotid sinus reflex.

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A NEW TECHNIC FOR VACCINATION AGAINST SMALLPOX

HAROLD J. FREEDMAN, M.D.*

BOSTON

SINCE the time of Jenner more than one hundred and thirty years ago, vaccination against smallpox has been used with increasing frequency. This period has witnessed great advances in the art of practicing medicine, but vaccination against smallpox, which was the first proved and important measure in the field of preventive medicine, has, despite its wide use, undergone very little change since its introduction. The results of any procedure probably constitute one's major concern, but when equal results can be obtained by several methods the simplicity of a procedure becomes a virtue. We offer a simple and satisfactory method of vaccination which if adopted will result in the least possible annoyance to the person vaccinated.

A complete review of other procedures used is not necessary, since the scratch, puncture and intradermal methods are generally recognized as being the more modern and customary ones. In 1925, White[1] advised multiple punctures as the method of choice. In 1926, Leake[2] reviewed the more commonly used procedures and concluded that the multiple-prick method — "thirty punctures in five seconds in a one-eighth-inch area" — was the best of all. This is quite cumbersome.

Why a new procedure, one may ask, when others obtain such favorable results? Ease of execution becomes highly desirable, particularly when there are large numbers of struggling infants to be vaccinated in a clinic. The multiple-prick method, even when performed with a very steady hand, may easily result in several "takes," and sometimes several of these coalesce to form one or more very large ones. At best, the resultant vesicle is very often uneven, and breaks, with the consequent oozing blister which may stick to clothing or dressing; not infrequently it becomes infected.

The technic to be discussed was first considered when the author observed Dr. Lewis W. Hill, of Boston, doing skin tests in his eczema clinic. He used a scarifier, which he[3] described in 1934. This is a circular punch, with sharp edges, measuring 2.3 mm. in diameter. Using it as a model we have constructed a similar one which has an additional inner cylinder; the outer edge, however, still has

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a diameter of 2.3 mm. The edges of both cylinders (Fig. 1) should be on the same horizontal plane. The instrument is constructed of stainless steel.* By means of two such sharpened circular areas we have hoped to produce a maximum contact of the vaccine virus within a minimal area. The capillary attraction of the two tubes ensures an excellent contact of the virus to the scarified

Fig. 1. *Showing concentric circular sharpened edges.*

area. After starting our present series we found that Dr. Hill had been using his scarifier for vaccination purposes in his private practice, with excellent results.

After washing the arm with soap and water and allowing it to dry, a drop of vaccine virus is placed on it. The sharpened edges of the scarifier are then put into the drop, and one complete turn is made against the skin. If the skin is stretched

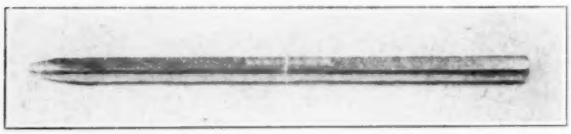

Fig. 2. *View of scarifier.*

tightly, very little pressure is needed to produce two concentric circles. Experience will show exactly how much pressure is necessary in order to break the skin without causing bleeding. The virus is then allowed to dry, no bandage or dressing being used. The scarification takes only a fraction of a second, there is no possibility of multiple takes, and the resultant vesicle, with practically no variation, is an even, round blister which in all probability will not break unless traumatized.

One hundred and fifty children between the ages of six months and five years have been vaccinated by this procedure. Ninety-three per cent had "takes." As the "take" depends on the virus used and the individual response to it, we did not expect to find any great difference in the results by this method compared with those by the scratch method. Of 200 children vaccinated by the latter method 94.5 per cent had "takes." Of the 11 failures with the use of the scarifier, 6 occurred in infants under one and 5 in children between one and five; the proportion of cases in these two age groups was approximately equal. Among these 11 failures, 5 children were revaccinated two more times without result.

The reactions caused by this method were definitely milder than those experienced when using the scratch method, but no important alteration in the clinical course of development of the lesions was observed, with the possible exception of an earlier appearance of the papule. This took place in from two to seven days, with an overwhelming majority on the third and fourth days. We doubt if the course of the true reaction to vaccine virus is modified in any way. This method may diminish secondary infection and in this way may lessen the incidence of complications.

Local reactions were almost wholly absent, only an occasional soreness and redness being noted. During the second week, a few moderately severe systemic reactions, such as vomiting, irritability and fever, were observed. Two children were very ill during the second week with a temperature of 104°F. for two days. One of them had broken his vesicle in several places when at play, and infection of the area had occurred. The second child had a severe upper respiratory infection.

The vesicles resulting from this method showed a remarkable similarity and regularity in appearance. At the end of the first week they were from 0.3 to 0.5 cm. in diameter. At the end of the second week they were flat and were drying, and averaged about 0.8 cm. in diameter. Only 3 vesicles broke, in all cases as a result of trauma.

Measurements of the vaccination scars made one, two or more months later showed a variation in size from 0.3 to 1.0 cm. in diameter. The crusts left no depression, and the resultant scars were very superficial. At times these scars were hardly visible, even though the crusting vesicle had assumed large proportions. With care, smaller takes are possible with scratch or puncture methods, but they could also be obtained by the use of a scarifier with a smaller outer diameter.

SUMMARY

A simple method of vaccination against smallpox is offered. It is recommended because of the ease of execution, the economy of time needed, the avoidance of multiple takes, the rarity of local or systemic reactions, the absence of complications and the resultant thin superficial scar.

371 Commonwealth Avenue.

*Manufactured by Charles W. Broadbent Co., 665 Huntington Avenue, Boston.

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CASE RECORDS OF THE MASSACHUSETTS GENERAL HOSPITAL

ANTEMORTEM AND POSTMORTEM RECORDS AS USED IN WEEKLY CLINICOPATHOLOGICAL EXERCISES

FOUNDED BY RICHARD C. CABOT, M.D.

TRACY B. MALLORY, M.D., *Editor*

CASE 23491

PRESENTATION OF CASE

A nineteen-year-old, American born Jewish girl entered the hospital complaining of pain over the lower sternum for two years.

Two years before entry the patient first noticed a mild, dull, nonradiating pain in a localized area over the sternum which would be constant for a few days and disappear for a month or more only to recur. It sometimes came on after meals and occasionally was severe enough to keep her awake at night. Eight months before entry she began to have difficulty in swallowing solid foods. This symptom very gradually increased in severity. In the last few months before entry the substernal pain became colicky in nature and was sufficiently severe to cause the patient to double up. It was dull in nature and never radiated. It could be slightly relieved by bicarbonate of soda. During her illness she lost about 10 lb. in weight. She had no significant vomiting, regurgitation, hoarseness, dyspnea, cough, hemoptysis or other symptoms. X-rays taken two months before entry showed some dilatation over a 3 cm. area in the midportion of the esophagus. The rugae in the area were poorly defined, but the wall did not appear to be definitely rigid. A repeat x-ray six weeks before entry showed an almost round, soft-tissue mass lying between the aorta and the spine over the fifth to eighth dorsal vertebrae and slightly to the right of the midline. The lesion seemed to be attached to the esophagus, which it displaced to the right. The surface of the lesion seemed to be smooth and slightly lobulated. It pulsated, but the pulsations might well have been transmitted. The heart was not remarkable.

The family history and past history were essentially noncontributory. She had had herpes zoster five years before entry.

The urine contained 30 to 40 white blood cells in the sediment per high-power field but was otherwise negative. The blood showed a red cell count of 4,190,000 with 80 per cent hemoglobin. The white cell count was 7350, 60 per cent polymorphonuclears. The stool was negative. The blood serum protein was 4.9 gm. per cent. A blood Hinton test was negative.

Fluoroscopy on entry showed the mass to be lying posterior to the trachea and esophagus and apparently not connected to the great vessels. X-rays taken ten days after entry showed that the mass had not changed in size or position. It was seen to be definitely attached to the wall of the esophagus, but the mucosal surface was probably not involved by the tumor.

On the fourteenth day an operation was performed.

DIFFERENTIAL DIAGNOSIS

DR. CHESTER S. KEEFER*: The diagnostic problem in the present case is to determine the nature and origin of the mass in the mediastinum which caused pain and dysphagia. In any consideration of mediastinal disorders it is necessary to decide from the symptoms, signs and the x-ray examination whether the process is in the anterior or posterior mediastinum. In many cases this is a relatively easy matter; in others it is difficult. In some instances the process is so large that it extends from the anterior to the posterior part of the chest, so that its point of origin cannot be determined with absolute certainty. In the present case, however, it seems reasonably clear that the mass which is described arose in the posterior mediastinum.

May we see the x-rays at this point?

X-RAY INTERPRETATION

DR. RICHARD SCHATZKI: The films of the chest show a picture which in the anteroposterior view looks like a large tumor, such as lymphoblastoma or any other tumor involving the mediastinal nodes on the right side. The lateral view, however, shows that the tumor is farther back, pressing the trachea slightly forward. The spine in that area does not show evidence of disease. After the administration of barium a rather unusual picture is seen. The barium runs around the mass. The esophagus where it is adjacent to the mass does not change at all in shape, as if the wall of the esophagus were involved by the mass. In the profile view it looks as if the mass were lying in the esophagus. There is an abrupt beginning and abrupt ending of the defect produced by the mass. The relief was very difficult to obtain in this area, apparently on account of the close relation between the mass and the esophagus, but in some pictures normal rugae seem to be present in the region of the mass. The question is, of course, whether this is a tumor which lies outside the esophagus or a tumor which lies inside the esophagus. I have in mind a definite type of tumor which might be expected to produce exactly this picture of an apparently intrinsic tumor which, nevertheless, does not destroy the mucosal relief.

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DIFFERENTIAL DIAGNOSIS (CONTINUED)

DR. KEEFER: I am not aware of a type of mass that produces such a characteristic picture.

In general, it may be said that space-occupying processes in the posterior mediastinum fall into one of three groups: (1) tumors, (2) aneurysms of the aorta and (3) infections. From the symptoms, signs and course of the disease it would seem justifiable to exclude an aneurysm of the aorta and a posterior mediastinal infection. A syphilitic aneurysm of the descending aorta occurring in a young girl with a negative Hinton reaction would be most unusual. The absence of signs of endocarditis and the presence of a mass which is well defined and one that has apparently caused symptoms for two years exclude a mycotic aneurysm of the aorta. In spite of the fact that the mass seemed to pulsate, I do not believe that this was a vascular tumor.

Infections in the posterior mediastinum capable of producing symptoms of two years' duration are due most often to tuberculosis arising from the spine or from necrotic lymph nodes. The shadow reported by x-ray was not that which is usually seen in prevertebral tuberculous abscesses, since these infections are most always bilateral, situated on both sides of the spine, with sharp, convex borders becoming narrower in the caudad direction. Besides, there was no mention of a lesion in the spine suggesting Pott's disease. I do not believe, therefore, that this was an infection of the posterior mediastinum.

This leaves the third group, namely tumors of the posterior mediastinum, and for the purposes of discussion they may be divided into benign and malignant tumors. Of the malignant tumors, we have those arising from bone, the esophagus or fibrous tissue and those resulting from metastases from organs elsewhere. Of the benign tumors there are those arising from the nerves, fibrous tissue, fat or cartilage. Rarely such tumors are classified as xanthomas, or they are epithelial-lined cysts arising from embryologic rests. In the case of any mediastinal tumor it is highly important to decide whether it is benign or malignant, largely because the former type of tumor can be removed successfully and completely. In brief, it may be remarked that benign tumors produce very few symptoms, grow very slowly, and may be present for a long period of time before giving rise to any difficulty. Malignant tumors, on the other hand, produce symptoms early. Pain is the commonest symptom, and invasion with destruction of the surrounding tissues is a conspicuous feature. The malignant tumors in the posterior mediastinum are usually chondro-osteosarcomas, arising from the ribs or vertebrae, or fibrosarcomas. They grow rapidly, produce severe pain early, and invade and destroy the surrounding soft tissues. Frequentiy they produce externally palpable masses. Another malignant tumor that is observed in the posterior mediastinum is an endothelioma of the pleura. This tumor grows rapidly and is almost invariably associated with effusion of fluid into the pleural cavity. Inasmuch as there is no destruction of the ribs or vertebrae or pleural effusion in the present case, I believe that one is justified in excluding a malignant tumor of the posterior mediastinum.

Of the benign tumors there are three groups which require comment: first, posterior mediastinal congenital cysts; secondly, cysts and leiomyomas of the esophagus; and thirdly, tumors arising from nerve tissue.

Posterior Mediastinal Congenital Cysts. If one excludes hydatid cysts of the posterior mediastinum, the other cysts found in this location are the so-called congenital mediastinal cysts. They contain ciliated epithelium (bronchiogenic cysts), gastric mucosa (gastrogenous cysts) or esophageal mucosa (esophageal cysts). Their genesis is probably from a pinching off of a bud of foregut at the time of its development in the embryo. In most instances, they are discovered at postmortem examination. They are usually so small that they cause no symptoms. When symptoms are present, they are due to pressure of the cyst on the surrounding structures or to the development of a gastric ulcer within the cyst which perforates and bleeds into the mediastinum and lung. The contents of bronchiogenic cysts are said to contain succinic acid. The contents of the cysts containing gastric mucosa are also acid; that is, they contain hydrochloric acid, so that this diagnosis might be verified by aspiration of the cyst and examination of its contents.

Cysts and Leiomyomas of the Esophagus. In view of the fact that this tumor was in the posterior mediastinum, and the symptoms were referred from the esophagus, it is necessary to entertain the possibility of a cyst attached to the esophageal wall. I do not know how one could make such a diagnosis clinically unless it were possible to demonstrate that the contents of such a mass were fluid. The other tumor of the esophagus which produces an extraesophageal mass without involving the mucosa is a leiomyoma. When these tumors ulcerate or become malignant, then the mucosa is involved and shows a defect. In the light of the description one would seem justified in saying that if this tumor was a leiomyoma of the esophagus, it had not involved the mucosa. Both of these tumors are exceedingly rare, but should be considered since the original symptoms were referred from the esophagus rather than elsewhere.

Tumors Arising from Nerve Tissue. These are referred to as ganglioneuromas, perineural fibroblastomas and neurofibromas, depending upon the character of the tissue in the tumors. They are among the most frequent of the benign tumors of the posterior mediastinum. They are frequently asymptomatic, and their presence is often discovered by x-ray examination. Indeed, they are among the most silent of all tumors in the mediastinum. When they produce symptoms they do so by compression of neighboring structures causing pain, dyspnea, dysphagia and cough. In general, they are homogeneous, round or oval in shape with a sharp or slightly lobulated border, situated in the posterior mediastinum, in front of or to one side of the vertebrae, where they project to the right or left and displace mediastinal contents but do not invade tissues unless they are malignant (fibrosarcoma, neuroblastoma). They are not influenced by deep x-ray therapy. Since they may resemble all other round masses in the posterior mediastinum, it is not possible to make the precise diagnosis in all cases; there are, however, certain associated features, which are present in *some* cases, that may assist in the diagnosis.

These tumors may be situated in any part of the posterior mediastinum; if in the upper thoracic region they project into the neck where they may be felt as firm rounded masses. Some of these tumors arise in, or at least invade, the tissues traversing the intervertebral foramen; when this takes place there is an erosion and thinning of the medial border of one or more pedicles of the vertebra at the site of the tumor. Later, thinning and erosion of the laminae occur, and when the tumor becomes very large the bodies of adjacent vertebrae are eroded. The intervertebral foramen may be enlarged. These tumors on occasion produce signs of a cord tumor with compression — an important point in diagnosis when present.

By and large, these tumors are not associated with signs of von Recklinghausen's neurofibromatosis elsewhere, but a few cases are on record in which the combination existed, so that one should look for signs of neurofibromatosis of other nerves, pigmentation of the skin, uvea and iris, scoliosis, and exacerbation of symptoms during adolescence and pregnancy. Benign tumors of the stomach with recurrent hemorrhage and ganglioneuromas in other organs may be present.

On the basis of the patient's age, duration of symptoms, and location and character of the mass, a leiomyoma of the esophageal wall, in spite of its rarity, seems to be the most likely diagnosis. My diagnoses in order of probability are: (1) leiomyoma of the esophagus; (2) congenital cyst of the posterior mediastinum; and (3) perineural fibroblastoma, compressing and displacing the esophagus.

Dr. Tracy B. Mallory: Dr. Schatzki, have you anything more to add?

Dr. Schatzki: I meant to say that I think this type of lesion seems to be extrinsic so far as the mucosa is concerned, whereas the deformity of the esophagus is more like an intrinsic lesion. It is representative of an intramural, extramucosal lesion.

Dr. Edward D. Churchill: Our preoperative diagnosis was benign tumor of the esophagus and mediastinum. We considered the differential diagnosis in much the same way as Dr. Keefer, perhaps not so completely, and came to the conclusion that although this tumor was, very probably, histologically non-malignant it could not, strictly speaking, be called benign because benign means "doing good," and this tumor was endangering the life of the patient. So we proceeded to operate with the diagnosis resting between neurofibroma and leiomyoma. The surgical approach was transpleural, and a well-encapsulated tumor was found arising in the wall of the esophagus, causing extreme deformity so that the esophagus appeared as a ribbon extending over the lateral surface of the tumor. The vena azygos was divided to facilitate the surgical approach, and the tumor shelled out of the wall of the esophagus. A few small branches of the vagus were divided, but the right vagus trunk was blocked with novocain and not divided.

Clinical Diagnosis

Benign tumor of the mediastinum and esophagus.

Dr. Keefer's Diagnosis

Leiomyoma of the esophagus?
Congenital cyst of the posterior mediastinum?
Perineural fibroblastoma, compressing and displacing the esophagus?

Anatomic Diagnosis

Neurofibroma of the esophagus.

Pathological Discussion

Dr. Mallory: The tumor in this case was not in my opinion a leiomyoma but a neurofibroma arising within the esophageal wall. The myomas are undoubtedly the most frequent benign tumors arising in the muscular wall of the intestinal tract. I think, however, that they do not occur quite so frequently as has been generally supposed. Our experience has been that fibromas are nearly as frequent as myomas. If our views are correct, a great many of the cases in the literature which have been

rather casually reported as leiomyomas may well have been fibromas.

This tumor was firm, fibrous and perfectly encapsulated, and lay, as Dr. Schatzki had prophesied from the x-ray examination, entirely within the muscular layer of the esophagus so that it was technically feasible to enucleate it and leave an intact mucosa behind. Microscopically it consisted of well-differentiated fibroblasts with abundant collagen formation. A tendency to whorl formation and also to palisading of the nuclei suggested a neural origin. No mitotic figures were found.

CASE 23492

Presentation of Case

A sixty-three-year-old, white, Finnish laborer was admitted complaining of "stomach trouble" for fifteen years.

Fifteen years before entry he began to have a sensation of his food sticking in the upper mid-epigastrium. There was no associated pain, nausea, vomiting or cough. Five years before entry he began to have a "sticking" epigastric pain which was aggravated by eating. His physician treated him for ulcer with little effect. Eleven months before entry his epigastric pain became more severe and began to radiate down into both lower quadrants. He developed anorexia and began to lose weight. His physician gave him some medicine which increased the pain, and he began to have a feeling of epigastric fullness and heaviness. He had difficulty in swallowing solid foods so that his diet consisted of semisolids and liquids. Six months before entry he was admitted to an outside hospital where thorough study revealed a kinking of the right ureter at the ureteropelvic junction and a slight enlargement of the mediastinum at the right side of the heart which was considered of no pathological importance. After discharge his pain increased, and he continued to lose weight. About six weeks before entry he noticed that the skin of his arms was becoming rough and that his ankles were beginning to swell. He had lost 15 lb. in the last year. He re-entered the outside hospital and after study for a week was referred to this hospital.

His past history and family history were noncontributory.

Physical examination revealed an emaciated, cachectic, anemic, elderly male in no acute discomfort. The skin was dry and rough, and there were scratch marks over the forearms and lower legs. The right anterior chest showed an area of dulness below the second interspace mesial to the right nipple line. The cardiac sounds could be heard as far out as the right nipple line, but there was no bruit or expansile pulsations of the chest wall. The abdomen was negative. There was slight edema of the ankles, and arterial pulsations could not be felt below the popliteal arteries. The blood pressure was 120 systolic, 74 diastolic.

The temperature was 98°F., the pulse 80. The respirations were 20.

The urine examination was negative. The blood showed a red cell count of 4,320,000 with 70 per cent hemoglobin, and a white cell count of 9550 with 64 per cent polymorphonuclears. The nonprotein nitrogen was 29 mg. per cent, the serum protein 5.9 gm. per cent, and the chlorides were equivalent to 105 cc. of N/10 sodium chloride. The basal metabolic rate was —16. Two blood Hinton tests were negative.

X-ray of the chest revealed an oblong, slightly lobulated mass in the right anterior mediastinum close to the heart, from which it could not be completely separated. It reached to the anterior chest wall, was homogeneous in character and showed no evidence of calcification. It showed pulsations of the ventricular type. The heart was normal in size and shape and the aorta was not remarkable. X-rays of the esophagus, stomach and duodenum were negative.

He was given a high-vitamin diet, and on the nineteenth hospital day an operation was performed.

Differential Diagnosis

Dr. Frederick T. Lord: The patient was a sixty-three-year-old Finn with a fifteen-year history; he had had dysphagia for that length of time, pain in the epigastrium for five years, and more pain for eleven months with radiation into the lower quadrants of the abdomen, loss of appetite and inability to swallow solids. Then there was an intervention of a disturbance of another sort six months ago, — a kink in the right ureter, — and the finding at that time of something in the mediastinum, and for six weeks roughness of the skin and swelling of the ankles.

May we see the x-rays?

X-Ray Interpretation

Dr. Aubrey O. Hampton: Here is the mass at the right border of the heart, a little above the right auricle. In the lateral view the mass is anteriorly placed but closer to the heart than to the chest wall. It is a hemielliptical mass, 10 cm. in diameter, flat against the heart and apparently touching the anterior aspect of the chest.

Differential Diagnosis (Continued)

Dr. Lord: With respect to the story, one would like to know more about the pain. It is desirable to have it adequately characterized in order to learn more about abdominal pain in chest conditions.

However, we know that disturbances in this region will occasionally give rise to epigastric pain and pain radiating around the costal margin. Then the rough and dry skin, with a low metabolic rate, is somewhat suggestive of a deficiency in the thyroid. One would like to know whether he was sensitive to cold, whether he had diminished perspiration. One would like more basal metabolic rates. I can go no farther with the data at hand. He was emaciated. We know he had had difficulty in swallowing, and more recently could not swallow solids, and he was probably in a state of semistarvation. The most important part of the evidence is the finding in the x-ray of the chest, which limits the disturbance to the anterior mediastinum, unless it is something arising in the posterior mediastinum which is emerging anteriorly. The long duration of this process makes it reasonable to conclude that if this was a tumor, as seems to be the case, it was primarily a non-malignant tumor. It may, of course, have recently become malignant, but of that we have no evidence. Echinococcus disease should be considered. There is no evidence in the story. One would want to know about an echinococcus fixation test. The ventricular impulse and the presence of a mass in the neighborhood of the heart suggest the possibility of a mural aneurysm. I am inclined to think, however, that in the absence of any history suggesting arterial or cardiac disturbance that it is not a mural aneurysm but falls into the group of thoracic tumors.

With respect to tumors, about the best I can do is to enumerate some of the possibilities and finally say that I cannot make a definite diagnosis. A ganglioneuroma would be the least likely because this mass is anterior and not posterior. So I am inclined to throw that out at once, but I am still left with a good many possibilities such as fibroma, chondroma, lipoma or some cystic tumor arising possibly in a thymus low in the mediastinum. Or it might be such a rare tumor as a cystic lymphangioma. I am inclined to lay some stress upon one other cystic tumor, a dermoid cyst or teratoma, and make a diagnosis of a probably benign tumor with a dermoid the most likely possibility on the doctrine of chance. I make this in the hope that if I make it enough times in the course of these exercises I shall finally be right.

Dr. Edward D. Churchill: The chief question we had to decide in this man, who was sixty-three years of age, was whether he should have a trial with x-ray therapy. His condition was not adequately presented in the clinical summary because he was dehydrated, emaciated and cachectic, had a hypochromic anemia, and suffered from vitamin deficiency. We kept him on the ward for approximately two weeks on a high-vitamin diet with ascorbic acid to relieve the subclinical scurvy. We could not co-ordinate the position of the tumor with the difficulty in swallowing, and we sent him a second time to the x-ray department for examination of the esophagus. Again, it was reported negative. So finally, with a diagnosis of tumor of the pericardium, we opened the chest and found a simple hydrocele of the mediastinum. The x-ray shadow was due to a very thin-walled cyst containing clear fluid. There was another cyst above this which ran up toward the neck, and I simply snipped the end off rather than extend the dissection to the upper mediastinum. Our diagnosis was changed from that of inoperable malignant disease to a perfectly innocent type of lesion. Dr. Chamberlain says that the patient is now completely relieved of the difficulty in swallowing, but he still has some pain in the epigastrium, which he thinks may be due to arthritis of the spine.

Preoperative Diagnosis

Tumor of the pericardium.

Dr. Lord's Diagnosis

Benign mediastinal tumor, ? dermoid.

Anatomic Diagnosis

Simple cyst of the mediastinum.

Pathological Discussion

Dr. Tracy B. Mallory: The cyst from our point of view seemed rather disappointing. We were rather hoping it would be one of Dr. Lord's dermoid cysts, but it was very thin-walled and contained no recognizable epithelium. I should assume that the lining was made up of the type of cell that one finds normally lining the pericardial and pleural cavities — so-called "mesothelium." These mesothelial cells are ordinarily so thin that they can hardly be distinguished from endothelium, but they occasionally thicken up to a cuboidal type of cell that looks quite like epithelium.

Dr. Churchill: We have had another case similar to this with a supracardiac shadow which we labeled as inoperable malignancy. The patient had already had a course of deep x-ray therapy in another hospital. In order to outline it more exactly we started out to put air into the mediastinum and found fluid which could be withdrawn; a cyst was subsequently demonstrated. That is the second case of simple cyst that we have seen.

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WHEN TO LOCK THE STABLE

The blunder that released into the open market this fall an untried elixir of sulfanilamide, with its tragic train of consequences, is an embarrassingly familiar story to us all. The drug sulfanilamide is apparently not discredited by what has occurred, but the possibilities of what may happen when certain substances are inadvisedly combined has been vividly portrayed.

Perhaps the boyish enthusiasm with which we accept nearly anything new, and swallow hook, line and sinker of the printed page, may be again tempered with that calm appraisal of the facts that has so long been considered a heritage of the medical fraternity. The matter of drug dispensing, however, is unfortunately not one in which the profession of medicine has any great voice, so that our dispassionate judgment, when we put it into effect, may not have a large field to cover.

In some manner, nevertheless, the public has a right to health protection against commercialism, ignorance and stupidity, and its failure to be so protected, as has been pointed out by W. G. Campbell, chief of the Food and Drug Administration, is directly due to the inadequacy of our present federal law. Under existing law the manufacturers of this product can be proceeded against only on a technical charge of misbranding.

The present catastrophe, after all, furnishes only a more than usually spectacular example of what has been taking place for years under our present system of uncontrolled drug distribution. Deaths and blindness are still continuing from the use of dinitrophenol, recklessly placed upon the market some years ago; deaths from liver damage have occurred as the result of cinchophen poisoning; acute and chronic poisoning results from the improper use of thyroid and radium preparations. Still, such estimable publications as the self-styled "leading breakfast table newspaper of New England" encourage self-dosing with their indiscriminate acceptance of patent-medicine advertisements.

The only remedy for this situation — a remedy that should be applied now, while our recent unhappy experience is fresh in our minds — is the enactment by Congress of an adequate and comprehensive national food and drug act. This constitutes one of those instances in which a strong central control may be legitimately exercised.

MATERNAL MORTALITY STUDY IN MASSACHUSETTS

The Division of Child Hygiene of the Massachusetts Department of Public Health has undertaken a five-year study of the maternal mortality in Massachusetts. This study is similar to one conducted in 1933 by the Children's Bureau of the Department of Labor at Washington, entitled "The Fifteen States' Study of Maternal Mortality" and quite like that which was carried on in Boston for the years 1933, 1934 and 1935 by the Boston Obstetrical Society in conjunction with the Boston Health Department.

The Division of Child Hygiene has asked the

Section of Obstetrics and Gynecology of the Massachusetts Medical Society to co-operate in this study. The section has willingly consented, and at its October meeting the Council of the Massachusetts Medical Society unanimously approved and asked that physicians interviewed give all possible help.

Men interested in obstetrics, all members of the Section of Obstetrics and Gynecology, will personally interview the physicians of the State in whose practice maternal deaths occur. In this essential the study will be more accurate from an obstetric point of view than that conducted in the fifteen states. The cases will be classified and studied, and the care received impartially evaluated. The data to be obtained will be extremely valuable as a means of determining the steps that must be taken to lower maternal mortality in Massachusetts, and it is hoped that all physicians who are interviewed will give their complete co-operation.

OBITUARIES

HARVEY PARKER TOWLE

1867-1937

Harvey Parker Towle, who died September 17, 1937, at the age of seventy years, was a distinguished member of the medical profession in Boston. He was born in Somerville, March 15, 1867, the son of Orel and Mary Sears Towle. He was graduated from Harvard College in 1888 and the Harvard Medical School in 1892. He had an internship in medicine at the Boston City Hospital and served there for a time as an administrative officer with the late Doctors Edwin W. Dwight and Edward H. Nichols. He was later appointed to the Department of Dermatology, in which subject he early became interested. A few years later he went abroad to Berne where he learned the German language and then to Vienna where he devoted himself for six months to the study of dermatology, later spending some time in London attending clinics. In 1906 he returned to Boston and opened an office for the practice of dermatology, which he continued until 1937, when he retired on account of ill-health.

He was dermatologist at the Boston City and Carney hospitals until 1903, when he joined the staff of the Massachusetts General Hospital where he served as co-chief with Dr. Charles J. White of the Dermatological Service from 1911 until 1925, when he resigned to devote himself entirely to his large private practice. For several years he was professor of dermatology at Dartmouth College, spending three weeks every year at Hanover, where he crowded many lectures and clinics into that brief period. He also taught dermatology a while at Boston University School of Medicine, and was a member of the medical advisory committee for the Leper Hospital at Penikese Island. He was instructor in dermatology at the Harvard Medical School and taught classes in the School of Tropical Medicine of the Harvard Graduate School of Medicine. During the World War he organized under the Surgeon General's Office a school of intensive training in dermatology and urology for medical reserve officers; he had a volunteer faculty of twenty men, who gave two groups of medical reserve officers a six weeks' course. He also did special work for the Red Cross in the matter of sending boxes to soldiers overseas. He made many contributions to the literature of dermatology and read many papers before various medical societies. He served as president of the American Dermatological Association in 1924, helped to create the New England Dermatological Society, and was a pioneer mover in organizing the Atlantic Dermatological Conference, composed of societies from Boston, New York, Philadelphia, Baltimore and Washington.

In 1898 he was married at Newton, Massachusetts, to Alice M. Buswell; there were three daughters — Elizabeth, Caroline and Alison — and a son who died in infancy.

He devoted himself to the care of his numerous patients with exceptional skill and attention. Resourcefulness and a rich knowledge of the pharmacopoeia, whose many remedies he applied with resourcefulness and common sense in his difficult field of practice, made him particularly successful in obstinate and chronic cases. He combined exceptional ability with a constant unfailing cheerfulness. He was sought and valued as a companion by his associates as well as by a long list of friends outside the profession. For the last few years of his life he was president of the Roxbury Clinical Record Club, an organization that meets once a month to dine together and listen to papers on medical and surgical subjects. He was indefatigable in securing speakers for the club on various subjects illustrating the progress of the medical art. His interest in all departments of medicine was intelligent and keen, and largely by his own efforts he made that organization one of the most delightful to which many of his contemporaries have had the privilege of membership. He was

devoted to his family and had a delightful summer home at Harwich.

He was a leader in dermatology, that department of medicine which he had made his own, and in his character combined common sense and strength with kindliness and good humor. Of the effectiveness of this combination the number of his sincere friendships is the best testimony.

F. B. L.

FRANCIS BROWNE GRINNELL

1887-1937

Francis Browne Grinnell, until recently assistant professor of bacteriology and immunology at the Harvard Medical School, died in England on November 17, 1937, after a long illness. Receiving his A.B. from Harvard in 1909 and his M.D. in 1913, Dr. Grinnell was attached to the Harvard Medical School from the time of his graduation until within a few months of his death, serving first in the Department of Preventive Medicine and Hygiene, then as bacteriologist at the Infants' Hospital and, from 1922 on, in the Department of Bacteriology.

His professional career, in addition to his academic connections, included membership in the Red Cross Sanitary Commission in Serbia in 1915 and service in the Medical Corps of the British Army from 1917 to 1919.

His last studies on dissociation of the typhoid bacillus, in connection with which he introduced a technic for the study of comparative virulence of strains and dissociants and laid the foundation for modern improvements in typhoid vaccination, placed him in the ranks of the foremost contributors to modern bacteriology.

Dr. Grinnell's intimate associates of the laboratory in which he served as a devoted teacher, as an investigator of great insight and accuracy and as a gentle and kindly companion submit this memorial in sorrow and deep affection.

John F. Enders,
LeRoy D. Fothergill,
J. Howard Mueller,
Hugh K. Ward (in absentia),
Hans Zinsser.

RESOLUTIONS ON THE DEATH OF CHARLES PORTER SYLVESTER

Charles Porter Sylvester died August 6, 1937. He was appointed to the Board of Registration in Medicine in 1925. He was elected chairman of the Board in 1927 and was each year re-elected to that office during the remainder of the time in which he was a member. In 1934 he became ill, and as his health progressively failed, he resigned his office and Board membership in August, 1936. All the present members of the Board served with him for various lengths of time, and at the annual meeting in July, 1936, unanimously re-elected him chairman. It was with regret that we of the Board watched him gradually fail during his last two years of service. He was always honest, fair and courteous in his relations with us as individuals and as an organized Board. He had a keen and alert mind, a comprehensive knowledge of medical education and medical licensure, and performed his Board duties with unusual ability, discretion and integrity. We are grieved that he has died, and extend our sympathy to his widow and his son. By his death the State has lost a faithful and able servant, his family a devoted husband and father, and the Board a valued member and leader.

Board of Registration in Medicine,
Francis R. Mahony, *Chairman,*
Daniel J. Hurley,
Edward A. Knowlton,
Mark Shrum,
Harry L. Stevens,
Royal P. Watkins,
Stephen Rushmore, *Secretary.*

MASSACHUSETTS MEDICAL SOCIETY

SECTION OF OBSTETRICS AND GYNECOLOGY

M. Fletcher Eades, M.D., *Secretary*
19 Bay State Road
Boston

Case History No. 49. Bleeding at Term From Central Placenta Previa

Mrs. E. P., a white multipara at term, aged thirty-two years, complaining of vaginal hemorrhage, was seen at the hospital on September 21, 1927. She stated that she had been staining and flowing for two hours. During the night before admission she had had a severe hemorrhage, soaking four sheets.

There was no family history of tuberculosis, diabetes, cancer or hemorrhagic disease. Her mother, three brothers and three sisters were living and well, while her father had died of pneumonia. She had had no serious illnesses or operations. She had had five normal deliveries, without complications; four children were alive and

A series of selected case histories by members of the section will be published weekly.

Comments and questions by subscribers are solicited and will be discussed by members of the section.

one had died in infancy. She also had had four miscarriages between the second and fourth months of pregnancy. Her menstruation had become established at the age of eleven, and had always been regular, every twenty-eight days, lasting three days, without pain or clots. The last menstrual period had begun on November 29, 1926, and she had first felt life in March, 1927.

The physical examination revealed that the patient was well nourished, with slight pallor of the face and mucous membranes. The temperature was 98.8°F. The buccal mucosa was pale. The lungs were clear and resonant throughout, and no adventitious sounds were heard. Rate of respiration was 20 per minute. The heart was not enlarged to percussion, and there were no murmurs. The rhythm was regular, the blood pressure was 100 systolic, 66 diastolic, and the pulse rate was 90 per minute. The uterus was enlarged to the size of a full-term pregnancy, the fetal parts could be palpated, and the fetal heart, which was regular and of good quality, could be readily heard in the right lower quadrant. There were no uterine contractions. A gentle rectal examination was made; a large boggy mass, which covered the entire cervix, was felt, and the presenting part could not be palpated.

The examination of a catheter specimen of urine revealed no abnormal elements. The examination of the blood showed a hemoglobin of 75 per cent (Tallqvist), a red blood-cell count of 3,500,000, and a white blood-cell count of 10,500.

A diagnosis of central placenta previa was made, and in view of the fact that the patient had experienced one brisk hemorrhage and no labor, abdominal delivery was decided upon. Under nitrous oxide-oxygen-ether anesthesia a transverse cervical cesarian section was performed.

The mother had an uneventful convalescence and was discharged home on the fourteenth postoperative day. The breasts were normal; the incision was well healed; the uterus had involuted normally and the lochia was normal. The baby was nursed by the mother and gained weight normally. On discharge it was over its birth weight of 7 lb.

Comment. The treatment of placenta previa depends upon its extent, the amount of hemorrhage, the condition of the cervix, and whether the child is alive or viable. The methods in common use are as follows: (1) rupture of the membranes; (2) cervicovaginal pack and a tight abdominal binder, preferably a Spanish windlass; (3) a bag applied extra- or intraovularly with pressure applied by means of a weight attached to the stem; (4) Braxton Hicks version; (5) conservative cesarian section; and (6) very rarely, the Porro cesarian section or supravaginal hysterectomy, when in the presence of uncontrollable hemorrhage. Two types of cesarian section may be employed — first, the classical section, which has many adherents on the grounds that the operation is performed away from the placental site, and secondly, the low or cervical section, which allows the inspection of the placental site. After placental extraction, the control of bleeding areas by sutures under direct vision adds definite protection against peritonitis. The latter operation may be performed with a longitudinal or transverse incision in the lower segment.

In the case under discussion the transverse cervical cesarian section was chosen with a satisfactory result for mother and baby. Since the more general adoption of cesarian section in the management of central placenta previa, both the infant and maternal mortalities have been markedly decreased.

In operating on a case with placenta previa it is always a good plan to have a compatible donor at hand in case transfusion becomes necessary.

MISCELLANY

JOSEPH H. PRATT DIAGNOSTIC HOSPITAL

The cornerstone of the Joseph H. Pratt Diagnostic Hospital was laid Sunday afternoon, December 5, in the presence of a distinguished group of guests. It is expected that the new six-story building, which will extend from Bennet Street back to Harvard Street and occupy the site of the former Franciscan Monastery of St. Clare, a landmark since 1885, and several other buildings, will be ready for occupancy within a year. It will form a further addition to the New England Medical Center, of which the Boston Dispensary, the Boston Floating Hospital and Tufts College Medical and Dental Schools are affiliated members. When completed, the five-story and basement hospital will contain 65 beds for private, semi-private and ward patients and complete x-ray and laboratory facilities, including research laboratories, and will be used for graduate and undergraduate education as well as for the study and diagnosis of patients in furtherance of the program of the Bingham Associates Fund for the advancement of medicine in New England.

At the conclusion of the exercises Dr. Pratt, physician-in-chief of the medical department of the Boston Dispensary and professor of clinical medicine at Tufts College Medical School, was presented with a *Festschrift* in honor of his sixty-fifth birthday. The volume contains eighty papers by his former pupils and colleagues, and was published by his friends and patients as a token of their esteem and gratitude.

PUBLIC HEALTH IS MAJOR EFFORT OF FOOD AND DRUG ADMINISTRATION

Control of food and drug adulterations having a direct bearing on public health continued to require the major efforts of the Food and Drug Administration in the last fiscal year, according to the annual report of W. G. Campbell, chief of the administration.

Mobilization of an emergency force to follow the 1937 flood in the Ohio Valley and protect residents from food

contaminated by flood waters was one of the conspicuous services by the Food and Drug Administration in the last year. Many of the 44 federal food men assigned to the work had had experience in the 1936 flood. They were assisted by about 80 men from state and city food inspection organizations and from other federal agencies. The emergency organization functioned promptly. Work programs were under way in some areas before the flood water began to recede. These crews handled food and drug preparations enough to have supplied a city of 200,000 population for a full year.

Another emergency requiring quick action by many field employees arose when it was discovered that emergency fumigation with hydrocyanic gas had made dangerous a quantity of raisins and other dried fruits — about 280,000 pounds — held up at the shipping point during the maritime strike and that these had been widely distributed. Food and Drug Administration workers quickly traced and seized nearly all the contaminated food, and the use of this method of fumigation for these commodities was immediately discontinued.

Mr. Campbell comments on the 1700 court cases terminated in the year — 1355 food cases and 345 drug cases. "Fines varied," he says, "from sums as low as $1, $2, and $5 to a maximum actually paid of $1500. Much higher fines were imposed in several cases but were remitted in large part by the courts. Three jail sentences imposed in connection with second offenses were also suspended and the defendants placed on probation. In pleas of guilty to the adulteration of olive oil with tea-seed oil, two defendants were each fined $6000 but $5000 was subsequently remitted in each case.

"Courts in general vouchsafed no explanation for the imposition of nominal penalties. In one instance of a $2 penalty for the shipment of filthy and decomposed walnuts, the court indicated that it had taken into consideration the fact that the defendant had suffered a $1400 loss in the seizure and destruction of the shipment by the Government. In another instance dealing with a practically worthless product offered as a treatment for serious diseases of the eye, the court imposed without comment, a fine of $1 and costs of $35.

"Other courts," Mr. Campbell continues, "have indicated a growing interest in the public protection afforded by the Food and Drugs Act. In passing sentence against a spinach canner who had entered a plea of guilty to the sale of dirty canned spinach a court remarked that if the defendant was unable to manufacture clean food, he had better get out of business and stay out of that court."

Discussing possible changes in the law, Mr. Campbell says: "As in the three preceding years, legislative efforts have been continued in Congress for a more adequate food and drug law. Senate Bill 5, introduced January 6, 1937, was passed by the Senate, March 9. This bill proposes a comprehensive revision of the Food and Drugs Act. Other bills of similar character are H. R. 300 and H. R. 5286. H. R. 5286 is designed to amend the Federal Trade Commission Act by authorizing specific control under that act of false advertising of foods, drugs, therapeutic devices and cosmetics.

"At the close of the fiscal year all these measures were pending before the House Committee on Interstate and Foreign Commerce. The principal issues involved were:

"1. Should seizure action to prevent distribution to consumers of a misbranded product be limited, pending court trial of the case, to a single interstate shipment of that article, or should the authority in the present law to seize all such shipments be continued?

"2. Should seizure cases be tried, as at present, where the goods are seized, before the courts and juries of the consuming areas where the goods are intended for distribution, or should the law be changed to authorize the case to be removed to the place from which the goods were shipped and there tried before the courts and juries of producing areas?

"3. Should the misbranding provision of the present law, which prohibits labeling that is 'false or misleading in any particular' be retained, or should the standard of truthfulness thus imposed be changed to ban labels only when 'misleading in a material respect'?

"4. Should false advertising of foods, drugs, therapeutic devices and cosmetics be controlled through injunctions and cease-and-desist orders, which carry no penalty for the initial offense or for subsequent offenses up until the date the injunction or order becomes effective, or should a deterrent to the commission of these offenses be set up by providing penalties for their initial commission?"

As compared with 1936, the administration collected more samples of food and drugs, but there were slight decreases in the totals of the criminal prosecutions and seizures. Improvement in foreign trade was reflected in an increase in the number of import samples and in time devoted to imports.

The spray residue situation has improved materially, largely because many states now meet fully the federal standards and are controlling poisonous spray residues on fruits and vegetables before the products leave the state. Federal workers analyzed more than 5000 samples of fresh fruit and vegetables, but on incomplete returns, state laboratories are known to have made more than 85,000 tests.

"Continuing the good record of several years, no authentic case of botulism from American commercially canned food was reported," says Mr. Campbell.

Both the salmon and tuna packs required considerable control last year, but the sardine and mackerel packs gave no reason for seizures. The administration and the salmon packing industry have worked out a new method for simplifying the control of the pack and making it more effective.

Adulteration of food with water is one of the most profitable forms of economic cheats, and one of the hardest to deal with, says the report, emphasizing the need for legal standards to establish limits on the water content of canned and bottled products.

The administration tested the vitamin D value of nearly 900,000 gallons of imported oils — principally cod-liver oil intended for animal feeding. About one third was deficient in vitamin value and was excluded. In interstate tests of vitamin products, 24 out of 34 samples failed to show the vitamin values claimed for them.

Conditions are improving notably, but the campaign for cleaner cream and butter will have to be continued, the report says. It also includes records of the enforcement of several minor acts administered by the Food and Drug Administration that regulate insecticides, caustic poisons, import milk, filled milk, naval stores, tea imports and the certification of coal-tar colors. — *U. S. Department of Agriculture.*

RURAL COMMUNITY HOSPITALS

The opening of the North Mississippi Community Hospital at Tupelo, Mississippi, on October 3, gives the northeastern part of this state a modern, fireproof, well-equipped fifty-bed hospital held in trust for the public, open to all qualified physicians and designed to serve the sick without discrimination.

This is the eighth such hospital to be built with the aid of the Commonwealth Fund of New York, which is now undertaking to provide one new hospital each year for a predominantly rural community which will agree to meet its share of costs and to run the institution in accordance with generally accepted standards. The ninth in the group is now under construction at Ada, Oklahoma, and the tenth has been awarded to the community centering in Provo, Utah.

The Fund began this project in 1926 as an experiment in meeting the need of rural communities for better medical and other health services. It was known that adequate hospital facilities were lacking in many rural districts, that recent graduates from medical schools were not entering rural practice in proportion to local needs, and that in spite of substantial progress in some parts of the country, health services in rural areas were not so well developed as those usually found in cities. It was assumed that the presence of well-planned and well-conducted hospitals would to some degree correct this situation, and experience in half a dozen different states indicates that the hope was justified.

The present plan is to aid in establishing hospitals having a capacity of between twenty-five and fifty beds and easily accessible to a rural community having a population large enough to make good use of such accommodations and capable of meeting operating costs. The hospital may either be a totally new institution, or may replace existing facilities which are clearly inadequate. The Fund furnishes plans, specifications and architectural supervision for the construction, and not less than $200,000 as a contribution toward capital costs. It advises in the organization of the hospital corporation and the medical staff, offers assistance in meeting the administrative problems of the early years, and provides a number of fellowships for postgraduate study by members of the medical staff.

Communities needing a fifty-bed hospital are required to raise from $40,000 to $60,000 for their share of the capital cost and must provide in addition a site (with service connections) and from $10,000 to $15,000 to meet the deficit of the first year's operation. Ownership and administrative responsibility are lodged in a local corporation, organized not for profit, which contracts with the Fund to operate the hospital in agreement with specified standards. These standards are such as to guarantee its integrity as a community institution and to justify its approval by the American College of Surgeons.

Hospitals founded under this program are now operating in Murfreesboro, Tennessee; Farmville, Virginia; Glasgow, Kentucky; Farmington, Maine; Wauseon, Ohio; Beloit, Kansas; and Kingsport, Tennessee.

NEW YORK ERADICATES BOVINE TUBERCULOSIS

On October 1, the State of New York was officially designated by the United States Department of Agriculture as a modified accredited area, indicating its practical freedom from tuberculosis of cattle. New York thus becomes the forty-sixth state in which all counties are in the modified accredited status, indicating that bovine tuberculosis has been reduced to less than 0.5 per cent, as shown by the tuberculin test.

In continental United States there are now no counties east of South Dakota that have not been designated as modified accredited areas, and only one other state, California, in which there are any nonaccredited counties.

Tuberculosis among cattle existed to a very great extent in many of the counties in New York when the work of eradicating it was undertaken co-operatively by the state and federal authorities in 1919. Since that time there has been a great increase in the volume of work conducted each year, and during the last three years it was possible to increase the volume of the work because of the additional federal funds made available for the purpose. It was necessary, however, for the State of New York to expend a large sum to accomplish this achievement.

RÉSUMÉ OF COMMUNICABLE DISEASES IN MASSACHUSETTS FOR OCTOBER, 1937

DISEASES	OCTOBER 1937	OCTOBER 1936	FIVE-YEAR AVERAGE*
Anterior Poliomyelitis	20	11	57
Chickenpox	291	330	336
Diphtheria	4	15	67
Dog Bite	735	718	613
German Measles	24	38	33
Gonorrhea	445	567	607
Lobar Pneumonia	308	227	211
Measles	89	254	196
Meningococcus Meningitis	6	6	7
Mumps	154	247	211
Paratyphoid B	1	1	0
Scarlet Fever	372	362	527
Syphilis	424	466	423
Tuberculosis, Pulmonary	250	278	292
Tuberculosis, Other Forms	27	27	37
Typhoid Fever	11	8	17
Undulant Fever	9	6	4
Whooping Cough	420	667	461

*Based on figures for preceding five years.

RARE DISEASES

Anterior poliomyelitis was reported from Acushnet, 1; Braintree, 1; Buckland, 1; Cambridge, 1; Deerfield, 2; Eastham, 2; Greenfield, 1; Lynn, 2; Malden, 1; Montague, 1; Northfield, 1; Quincy, 2; Reading, 1; Rowley, 1; Swampscott, 1; Templeton, 1; total, 20.

Diphtheria was reported from Brockton, 1; Fall River, 1; Gardner, 1; Somerville, 1; total, 4.

Dysentery, bacillary, was reported from Danvers, 1; Lawrence, 1; Reading, 1; Williamsburg, 1; total, 4.

Encephalitis lethargica was reported from Dartmouth, 1.

Meningococcus meningitis was reported from Boston, 1; Fitchburg, 1; Malden, 1; Peabody, 1; Revere, 2; total, 6.

Paratyphoid B was reported from Williamstown, 1.

Septic sore throat was reported from Boston, 9; Brookline, 1; Everett, 1; Fall River, 2; Sturbridge, 1; Worcester, 1; total, 15.

Tetanus was reported from Fall River, 1; Marlboro, 1; total, 2.

Trachoma was reported from Worcester, 1.

Trichinosis was reported from Boston, 2; Cambridge, 1; total, 3.

Typhoid fever was reported from Boston, 1; East Longmeadow, 1; Lynn, 1; Norwood, 1; Revere, 1; Rockport, 1; Shrewsbury, 1; Somerville, 1; Springfield, 1; Wilmington, 1; Worcester, 1; total, 11.

Undulant fever was reported from Athol, 1; Groton, 1; Hopedale, 1; Lunenburg, 1; Nantucket, 1; North Adams, 1; Oxford, 2; South Lancaster, 1; total, 9.

The incidence of diphtheria showed a record low both for this and any other month ever reported.

Lobar pneumonia was reported above the five-year average.

Typhoid fever, anterior poliomyelitis and tuberculosis (other forms) were reported below the five-year average.

Pulmonary tuberculosis was reported at a record low figure.

The reported incidences of German measles, chickenpox, mumps, and measles were below the five-year average.

Undulant fever had the highest reported incidence for any year to date.

Scarlet fever, whooping cough and meningococcus meningitis were reported below the five-year average.

The incidence of paratyphoid fever has fallen to a low average figure.

The reported incidence of animal rabies continues at a fairly high figure. Foci of animal rabies are most noticeable in Templeton, Danvers, Cambridge and Newton and on the North Shore.

MASSACHUSETTS DUST AND FUME CODE COMMITTEE

Commissioner James T. Moriarty of the Massachusetts Department of Labor and Industries has appointed the following committee to assist the department in the preparation of rules and regulations for the control of hazardous dusts and fumes in the manufacturing establishments of the State:

Joseph C. Aub, M.D., of the Collis P. Huntington Memorial Hospital
E. H. Ballard, general foundry superintendent, General Electric Company
John Daniels, legislative agent, Associated Industries of Massachusetts
Philip Drinker, professor of industrial hygiene, Harvard School of Public Health
Laurence Foley, international president, Granite Cutters International Association of America
Francis T. Hunter, M.D., of the Massachusetts General Hospital
William M. Rand, president, Merrimac Chemical Company
Robert J. Watt, secretary-treasurer, Massachusetts Federation of Labor
Stephen E. Whiting, chief engineer, Liberty Mutual Insurance Company

In the field of industrial dust control, the current undertaking is a sequel to the investigation and report of the Massachusetts Special Industrial Disease Commission of 1933-1934 and the findings of the Granite Dust Control Project conducted by the department's Division of Occupational Hygiene during 1935 and 1936.

As a basis for the establishment of maximum allowable concentrations of industrial fumes, the committee has before it a tabulation in which all standards known thus far to have been promulgated are combined with tentative figures proposed by the Division of Occupational Hygiene and the criticisms of twenty-two authorities in this country and abroad to whom these figures were submitted. This is believed to be a more comprehensive symposium of opinion on the subject of allowable fume concentrations than has previously been undertaken by any governmental authority.

THE ORGANIZATION OF THE COMMUNITY FUND CAMPAIGN

The size and extent of the organization built up in the community each year for the Community Federation Campaign is not understood or appreciated by most citizens. The area covered includes not only the City of Boston but also 43 cities and towns considered "Metropolitan" and, in addition, 32 somewhat more remote cities and towns. Within this area live approximately two million people, or about half the population of the State, all dependent in various ways and in varying degrees upon the 106 social agencies comprising the Community Federation of Boston.

The City of Boston is characterized by business organization and activity, and hence, the campaign each year has an Industry and Finance Division whose work is primarily the education and solicitation of companies, executives and employees at their places of business, all being classified in accordance with about 150 trade groups. About 3500 leaders in all branches of industry and finance work together in preparing for and conducting the campaign. Nearly one half the total funds subscribed during the campaign are subscribed through this division.

The residential neighborhoods of the City of Boston and the smaller business units located therein are divided into 41 districts, each having a neighborhood organization. This is the Districts Division, and in it approximately 2000 workers cover completely the various districts by house-to-house or office-to-office visits.

The Metropolitan Division is a larger unit. The campaign includes solicitations in all cities and towns roughly encompassed within a circle with a 15-mile radius from the State House. In each of these cities and towns a chairman is selected, who builds an organization in his own community. These workers total about 2400. Also under the Metropolitan Division of the campaign are those 32 additional towns outside of the geographic Metropolitan area. These are grouped into the northern, western and southern Massachusetts divisions. It is interesting to know that each campaign brings numerous subscriptions by mail, not only from the outside cities and towns organized in this way but from other states and even from foreign countries.

Working throughout the whole area is the Special Gifts Division, a relatively compact unit of about 230 workers. Their duty is to contact about 2000 individuals whose subscriptions total about 40 per cent of the amount raised in the whole campaign.

The educational part of the campaign is most important, particularly in the early stage before the work of solicitation begins. The Community Crusade, the Speakers' Bureau, the "Come and See" Tours Committee, and other important nonsoliciting activities, take the time and energies of over 500 additional workers.

In this campaign doctors play only a small part, but although small, this part is important because they are in touch with many members of the community. If interest and enthusiasm are high, they will spread to patients and to friends. The chairman of the Doctors' Division is Dr. Thomas R. Goethals. Organization of this division is well in hand, and the final list of committeemen will soon be ready for publication. This list will include the names of about 100 doctors, 90 of whom are committeemen, to be divided into ten groups each under one of the following vice-chairmen:

Dr. Theodore L. Badger	264 Beacon Street
Dr. Trygve Gundersen	264 Beacon Street
Dr. William B. Breed	264 Beacon Street
Dr. Joseph H. Burnett	520 Commonwealth Avenue
Dr. Paul A. Chandler	5 Bay State Road
Dr. Stewart H. Clifford	1101 Beacon Street, Brookline
Dr. Francis C. Newton	319 Longwood Avenue
Dr. Robert S. Palmer	330 Dartmouth Street
Dr. Langdon Parsons	330 Dartmouth Street
Dr. William T. Salter	695 Huntington Avenue

NOTES

An advisory committee to undertake the formulation of a national program for prevention of death from pneu-

monia has recently been appointed by Dr. Thomas Parran, Jr., Surgeon General. This committee includes: Dr. Roger I. Lee, of Boston; Dr. Lloyd D. Felton, associate professor of pathology and bacteriology, Johns Hopkins University School of Medicine and formerly of the Department of Preventive Medicine and Hygiene, Harvard Medical School; and Dr. Roderick Heffron, of the Commonwealth Fund, New York City, who established the pneumonia-control program of the Massachusetts Department of Public Health.

As of January, 1938, the *Journal of Morphology*, published by the Wistar Institute of Anatomy and Biology, Philadelphia, will be published bimonthly instead of quarterly. There will be two volumes per year, and the cost per volume has been reduced from $12.00 to $10.00.

CORRESPONDENCE

"PRINCIPLES AND PROPOSALS"

To the Editor: Apropos of the discussions of the "Principles and Proposals" and modifications of them now current, you may be interested in the text of a letter I wrote last May in reply to a request from Dr. Hugh Cabot for my consideration of the first set and my signature to them, if approved.

E. Stanley Abbot, M.D.

29 Gloucester Street,
Boston, Massachusetts.

* * *

I have gone over your "Statement of Principles and Proposals" with much care, in the light of the two volumes *American Medicine* and of the many reviews in the lay and medical press.

I agree substantially with the four Principles, though I should prefer to have the first read "That the health of the people is of direct concern to the government"; to insert, in the third, after the words "adequate medical care" the phrase "though they may be related"; and to insert "competent physicians" before "voluntary agencies" in the fourth, and perhaps change "four" to "five." These are comparatively minor matters, however.

As to the Proposals, I agree with the first, concerning the prevention of illness, though I should call it the second. To my mind, normal health is the first thing to be promoted. Government recognizes this in its provision of national, state and local parks, playgrounds, and so forth, as promotive of health. Prevention of illness is secondary.

With your Proposal 2 I agree substantially, but I believe that private individuals and agencies should also help provide "adequate medical care" for at least some of the "medically indigent." There will always be disagreement as to what "adequate medical care" includes and demands, especially in individual cases.

The next three Proposals, relating to "public funds," are stated in such general terms that I should not dare to subscribe to them without knowing specifically what is intended in each instance. In different places, at different times, and in different amounts, "public funds" have been allocated to all the objects mentioned in Proposals 3, 4 and 5, though very likely not in the abundance that some recipients thought desirable.

Public funds of course means money raised by taxes, direct and indirect, from all taxpayers. They are appropriated by legislators. If of appreciable size they are liable to two abuses — logrolling by legislators, and political graft and favoritism by recipients. State, "semi-state," county, municipal and even private hospitals were conspicuous examples of these abuses in Pennsylvania fifteen years ago, and had been for decades; they probably are now, though possibly to a less extent. Then there is always the danger, if the public funds are of considerable size, that the legislators and administrators will use political influence in the distribution and management of such funds.

Too much dependence on public funds tends, I am inclined to think, toward a mild, often beneficial, paternalism on the part of government. This is an entering wedge for a benevolent, insidious socialism, liable to extend and be followed in the course of time by a tendency to domination, even eventually to dictatorship. It is the camel's nose getting under the tent.

I do think that government should pay the necessary costs of care of the "medically indigent" to such private hospitals as render adequate service, if no private person or agency does.

As to Proposal 6, I suspect that it may have reference to the relations between hospitals for acute illnesses and those for chronic and incurable ones, and to the possible competition between public and private hospitals, about both of which there are valid arguments on both sides. I believe in not duplicating facilities unnecessarily.

I agree heartily with Proposal 7, but recognize that sound evolution is a slow and uneven process at best, often much slower than some, perhaps most, advocates of certain advances wish.

As to Proposal 8, each of the measures proposed involves other as well as medical factors. The *investigation* and *planning* should be in collaboration with *experts* in all the factors involved. The ultimate *direction* of any given measure or project should be under expert guidance, perhaps of one person, perhaps of a group.

As to Proposal 9, I am not at all sure that "adequate administration of the health function of the government" requires "functional consolidation of all federal health and medical activities under one department." Maybe it does. I do not feel competent to judge even after reading the last 200 pages of the American Foundation's report. Among federal departments, no matter how organized, there are, inevitably, overlapping and interpenetrating fields, with rivalries and uncertainties as to jurisdiction. I am inclined to think that fewer departments result in less rivalry and less liability of needed action failing to be carried out.

My general attitude is that, in a democracy, each individual and each private agency, in the fulfilment of their respective obligations, should do all they can without direct governmental subsidy or aid; that of things necessary to be done, government should do only what individuals and private agencies cannot or should not do; that of governmental agencies the larger or more inclusive should be called upon to do only those things that the next smaller cannot do effectively, whether because of lack of sufficient funds or facilities, or lack of jurisdiction or authority; and finally that there should be co-operation and co-ordination throughout, and not competition or interference between and among them.

I agree fully with the statement that health insurance alone is not a satisfactory solution of the problems involved. It attacks only a small part of the problems.

I regret that I cannot sign the "Statement of Principles and Proposals."

To the Editor: The undersigned physicians who are hospital administrators wish to endorse the editorial ap-

pearing in December *Hospitals* on the matter of the interpretation of the fifth clause of the proposals recently made by a group of medical men on the relations of federal, state and city governments and hospitals.

Inasmuch as the interpretation has been made that this proposal favors government subsidies to hospitals, we write this letter to make clear our understanding and interpretation of the proposal in question.

The editorial follows.

FREDERIC A. WASHBURN, M.D.,
JOSEPH B. HOWLAND, M.D.,
CHARLES F. WILINSKY, M.D.,
NATHANIEL W. FAXON, M.D.

Boston, Massachusetts.

* * *

PRINCIPLES AND PROPOSALS SUBMITTED BY 430 PHYSICIANS*

In the October 16 issue of the *Journal of the American Medical Association* appears an editorial entitled, "The American Foundation Proposals for Medical Care." Although we understand that these proposals do not emanate from the American Foundation itself, but rather from physicians who are connected with the recent study made by the Foundation and others, nevertheless the following principles and proposals were circulated among members of the profession, who were asked to endorse them if they felt so inclined:

PRINCIPLES

1. That the health of the people is a direct concern of the government.
2. That a national public health policy directed toward all groups of the population should be formulated.
3. That the problem of economic need and the problem of providing adequate medical care are not identical and may require different approaches for their solution.
4. That in the provision of adequate medical care for the population four agencies are concerned: voluntary agencies, local, state and federal governments.

PROPOSALS

1. That the first necessary step toward the realization of the above principles is to minimize the risk of illness by prevention.
2. That an immediate problem is provision of adequate medical care for the medically indigent, the cost to be met from public funds (local and/or state and/or federal).
3. That public funds should be made available for the support of medical education and for studies, investigation and procedures for raising the standards of medical practice. If this is not provided for, the provision of adequate medical care may prove impossible.
4. That public funds should be available for medical research as essential for high standards of practice in both preventive and curative medicine.
5. That public funds should be made available to hospitals that render service to the medically indigent and for laboratory and diagnostic and consultative services.
6. That in allocation of public funds existing private institutions should be utilized to the largest possible extent and that they may receive support so long as their service is in consonance with the above principles.
7. That public health services, federal, state and local, should be extended by evolutionary process.
8. That the investigation and planning of the measures proposed and their ultimate direction should be assigned to experts.
9. That the adequate administration and supervision of the health functions of the government, as implied in the above proposals, necessitates in our opinion a functional consolidation of all federal health and medical activities, preferably under a separate department.

The editorial in question is sharply critical of the procedure of these members of the Committee and of their program. The parts of it which most of all pertain to hospitals are Proposals 5 and 6. The editorial in the *American Medical Association Journal* says:

> Still more serious is the fifth proposal, to the effect that the government subsidize private hospitals in relationship to their laboratory, diagnostic and consultative services. The nonprofit voluntary hospital is the pride of American philanthropy and a major factor in maintaining a high quality of medical service. The tender of governmental funds to such institutions for the care of an ill defined group called the medically indigent appeals to the unthinking physicians who have endorsed these principles and proposals. Yet such an arrangement would put the hospitals promptly into the practice of medicine.

*Editorial. Hospitals 11:65, 1937.

It is probably true that a direct subsidy to the voluntary hospital by a government agency would be a mistake. It may lead to political control. It takes away the initiative which is given the hospital by the necessity of obtaining funds from the community for its support. It deprives the community of the direct interest in the hospital which it has when it voluntarily contributes.

On the other hand, it is entirely possible to use public funds in payment for services rendered by the voluntary hospital on a per capita cost basis for the care of the medically indigent by the local government, if possible; if not, perhaps by state or federal funds. If this payment is made in return for the care of patients on the basis proposed, and it is made a matter of right by law, there is no chance for political interference. The hospital will still need all the help that it can get from the community in the form of gifts by the benevolent. In many parts of the country it is now true that hospitals are thus reimbursed. It is so done in New York City, although perhaps the reimbursement does not equal the cost, but in many cities in Massachusetts — Boston, for instance — where a city hospital exists, the voluntary hospitals care for many of the cities' indigent patients with no reimbursement whatever from public funds, unless we may say that as they are tax-exempt they indirectly are thus repaid for their expenditure for this purpose.

As to the criticism that such an arrangement puts hospitals into the practice of medicine, the roentgenologist, pathologist and anesthetist would be recompensed exactly as they are today — some by salary and some on a fee basis.

RECENT DEATHS

BATES — WALTER S. BATES, M.D., of South Street, Barre, died November 27. He was in his seventy-sixth year.

Born in Barre, he received his degree from the University of Vermont College of Medicine in 1896. He practiced medicine in Barre for more than forty years.

He was a fellow of the Massachusetts Medical Society and the American Medical Association. Dr. Bates was a member of Barre Grange, a trustee of Barre Savings Bank and a member of the Masonic Order.

His widow and a brother survive him.

BRIGHAM — ROBERT B. BRIGHAM, M.D., of 210 Elm Street, Northampton, died after a short illness, November 26. He was thirty-five years of age.

A native of Newton he attended the Newton schools, graduated from Williams College in 1924 and received his degree from Harvard Medical School in 1928. He interned for two years at the Peter Bent Brigham Hospital, studying under Dr. Harvey Cushing. He later moved to Portland, Oregon, where he became associated with the Good Samaritan Hospital, later becoming assistant to Dr. C. L. Ogle at Grant's Pass, Oregon. In April, 1931, Dr. Brigham moved to Northampton and had practiced there until his illness.

He was a fellow of the American Medical Association and the Massachusetts Medical Society. He was also a member of the Delta Upsilon and Phi Beta Pi fraternities, on the staff of the Cooley Dickinson Hospital, president of the Northampton Boy Scout Council, vice-president of the Hampshire-Franklin Council, a Rotarian and a captain in the Medical Reserve Corps.

His widow, the former Katherine Graham, a son, his parents, a grandmother and a brother survive him.

NOTICES

AMERICAN BOARD OF INTERNAL MEDICINE

The American Board of Internal Medicine will hold its next written examination on Monday, February 14, 1938, in various centers of the United States and Canada.

The examination will consist of two sessions of three hours each with the morning session held at 9 o'clock and the afternoon session held at 2 o'clock.

The candidates who are successful in this written examination will be eligible to take the practical examination which will be held the Friday and Saturday prior to the opening of the annual session of the American Medical Association in San Francisco in June, 1938.

The final date for filing applications for this written examination is January 15, 1938, and all applications should be in the office of the chairman before that date.

For further particulars and applications address: Dr. Walter L. Bierring, M.D., *Chairman,* American Board of Internal Medicine, Suite 1210, 406 Sixth Avenue, Des Moines, Iowa.

SOUTH END MEDICAL CLUB

The next regular meeting of the South End Medical Club will be held at the headquarters of the Boston Tuberculosis Association, 554 Columbus Avenue, Boston, on Tuesday, December 21, at 12 noon.

Charles E. Wilde, Esquire, assistant to the general counsel, Liberty Mutual Insurance Company, Boston, will speak on "Co-Operation of Doctors with Casualty Insurance." Dr. J. Harper Blaisdell, of Boston, will speak on "Associated Hospital Service."

All physicians are cordially invited to attend.

JOHN B. HALL, M.D., *Secretary.*

NEW ENGLAND SOCIETY OF PHYSICAL MEDICINE

The regular meeting of the New England Society of Physical Medicine will be held at the Hotel Kenmore, Boston, on Wednesday evening, December 15, at 8:00.

PROGRAM

Presentation of case reports.

Infections of the Uterine Cervix and Their Treatment by Electrosurgical Methods. Dr. Benedict F. Boland. Discussion by Dr. Sylvester B. Kelley.

The Council will meet at 6:00. Dinner will be served in the Empire Room at 6:30.

All members of the medical profession are cordially invited to attend.

WILLIAM D. MCFEE, M.D., *Secretary.*

NEW ENGLAND HEART ASSOCIATION

The next meeting of the New England Heart Association will be held in the amphitheater of the Mallory Institute of Pathology, Boston City Hospital, on Monday, December 13, at 8:15 p. m.

PROGRAM

Clinicopathological Correlations. Dr. Soma Weiss.

The Circulatory Effects of Intravenously Injected Solutions of 50 Per Cent Dextrose and Sucrose in Normal Individuals and in Patients with Heart Disease. Dr. Laurence B. Ellis.

Friedländer's Bacillus Pericarditis. Report of a Case. Dr. James M. Faulkner.

The Myocardium in Fatal Cases of Hemolytic Streptococcus Infections. Drs. G. Kenneth Mallory and Chester S. Keefer.

Infarction of the Heart. A Morphological and Clinical Appraisal of 300 Cases. Dr. William B. Bean.

The Effect of Epinephrin and Pitressin in Circulatory Collapse. Drs. Eugene A. Stead, Jr., and Paul Kunkel.

Repair in Coronary Sclerosis: A Menace? A Blessing? Dr. Timothy Leary.

What Is the Most Favorable Position for the Chest Electrode? Dr. James M. Faulkner.

Interested physicians and medical students are invited to attend.

JAMES M. FAULKNER, M.D., *Secretary.*

JOINT MEETING OF THE ARLINGTON DOCTORS' AND THE BELMONT MEDICAL CLUBS

There will be a joint meeting of the Arlington Doctors' and the Belmont Medical clubs at the Ring Sanatorium and Hospital, Arlington Heights, on Tuesday evening, December 14, at 8:30.

Dr. W. K. Nance, of the resident staff of the Ring Sanatorium and Hospital, will speak on "Bedside Observations in Insulin Shock Therapy." Drs. Alfred Yood, of Arlington, and James H. Townsend, of Boston, will discuss the paper.

A buffet supper will be served following the program.

WALTER J. E. CARROLL, M.D., *Secretary,*
Arlington Doctors' Club

LEO A. BLACKLOW, M.D., *Secretary,*
Belmont Medical Club.

COMMUNITY CHURCH OF BOSTON MEETING

Dr. Michael M. Davis, chairman of the Committee on Research in Medical Economics, New York City, and Dr. Nathaniel W. Faxon, of Boston, will speak at the meeting of the Community Church of Boston at Symphony Hall, Sunday, December 12, at 10:45 a. m. Their subject is "Better Medical Care for Less Money."

MASSACHUSETTS SOCIETY OF EXAMINING PHYSICIANS

There will be a meeting of the Massachusetts Society of Examining Physicians at the Copley-Plaza Hotel, Boston, on Thursday evening, December 16. The Council meeting at 6:00 will be followed by dinner at 6:30. The program will begin at 8:30.

PROGRAM

The Injection Treatment of Hernia. Dr. Bradley L. Coley, associate surgeon, Hospital for Ruptured and Crippled, New York City. Discussion opened by Dr. Horace K. Sowles.

Principles and Proposals for the Improvement of Medical Care. Dr. Charles E. Mongan. Discussion opened by Dr. Channing Frothingham.

FRANCIS R. MAHONY, M.D., *President,*
WILLIAM PEARCE COUES, M.D., *Secretary.*

TUMOR CLINIC OF THE BOSTON DISPENSARY

The Tumor Clinic of the Boston Dispensary has planned to show a series of moving pictures on the following Fridays during December from 12:45 to 1:15 p. m.

December 10. Abdomino-Perineal Resection, Miles. Loop Colon.

December 17. Posterior and Perineal Resection. Modified Mikulicz Operation.

December 31. Subtotal Gastrectomy.

SOCIETY MEETINGS AND CONFERENCES

CALENDAR OF BOSTON DISTRICT FOR THE WEEK BEGINNING MONDAY, DECEMBER 13

MONDAY, DECEMBER 13

*8:15 p. m. New England Heart Association. Amphitheater of the Mallory Institute of Pathology, Boston City Hospital.

TUESDAY, DECEMBER 14

*9 a. m. - 10 a. m. Boston Dispensary. Chemotherapy. Dr. Kenneth De Hart.

9:30 a. m. Massachusetts General Hospital. Thoracic Clinic, Ether Dome.

WEDNESDAY, DECEMBER 15

8 a. m. Massachusetts General Hospital. Grand rounds. Orthopedic department.

*9 a. m. - 10 a. m. Boston Dispensary. Hospital case presentation. Dr. S. J. Thannhauser.

*12 m. Clinicopathological conference. Children's Hospital Amphitheater.

*8 p. m. New England Society of Physical Medicine. Hotel Kenmore.

THURSDAY, DECEMBER 16

8 a. m. Massachusetts General Hospital. Circulatory clinic rounds.

8:30 a. m. - 9:30 a. m. Exchange visit, surgical and orthopedic staffs of the Peter Bent Brigham and Children's hospitals, held this week at the Peter Bent Brigham Hospital. Dr. Cutler and associates.

*9 a. m. - 10 a. m. Boston Dispensary. Social Service Case Presentation. Mrs. H. B. Hooker, Miss E. Grundy.

11 a. m. Massachusetts General Hospital. Medical grand rounds.

12 m. Massachusetts General Hospital. Clinicopathological conference.

8:30 p. m. Massachusetts Society of Examining Physicians. Copley Plaza Hotel, Boston.

FRIDAY, DECEMBER 17

*9 a. m. - 10 a. m. Boston Dispensary. Recent Research Problems in the Thyroid Clinic at the Massachusetts General Hospital. Dr. Saul Hertz.

10 a. m. Massachusetts General Hospital. Fracture rounds.

12:45 p. m. - 1:15 p. m. Tumor Clinic of the Boston Dispensary.

SATURDAY, DECEMBER 18

*9 a. m. - 10 a. m. Boston Dispensary. Hospital case presentation. Dr. S. J. Thannhauser.

*10 a. m. - 12 m. Staff rounds at the Peter Bent Brigham Hospital. Conducted by Dr. Henry A. Christian.

SUNDAY, DECEMBER 19

Free public lecture, Beth Israel Hospital, Boston, in conjunction with the Women's Auxiliary, 4 p. m. Appendicitis and Other Abdominal Emergencies. Dr. Charles G. Mixter.

*Open to the medical profession.

DECEMBER 10 — Massachusetts Psychiatric Society, Boston Psychopathic Hospital, 8 p. m.

DECEMBER 10, 17, and 31 — Tumor Clinic of the Boston Dispensary. Notice above.

DECEMBER 12 — Community Church of Boston meeting. Page 969.

DECEMBER 13 — New England Heart Association. Page 969.

DECEMBER 14 — Joint meeting of the Arlington Doctors' and the Belmont Medical clubs. Page 969.

DECEMBER 15 — New England Society of Physical Medicine. Page 969.

DECEMBER 16 — Massachusetts Society of Examining Physicians. Page 969.

DECEMBER 20 — Boston Medical History Club. 8:15 p. m. Boston Medical Library.

DECEMBER 21 — South End Medical Club. Page 969.

JANUARY 4 — Greater Boston Medical Society, Beth Israel Hospital, 8:30 p. m.

JANUARY 13 — Pentucket Association of Physicians. Hotel Bartlett, 95 Main Street, Haverhill, 8:30 p. m.

FEBRUARY 14 — American Board of Internal Medicine. Page 969.

APRIL 4-8 — The American College of Physicians. Page 41, issue of July 1.

MAY 31, JUNE 1 and 2 — Annual meeting of the Massachusetts Medical Society. Hotel Bradford, Boston.

OCTOBER 17-21 — Clinical Congress of the American College of Surgeons, New York City.

DISTRICT MEDICAL SOCIETIES

BRISTOL SOUTH

MAY 5 — 5 p. m., New Bedford.

ESSEX SOUTH

JANUARY 5 — Danvers State Hospital. Clinic at 5 p. m. Dinner at 7 p. m. Speaker and subject to be announced.

FEBRUARY 2 — Council Meeting, Boston.

FEBRUARY 9 — Essex Sanatorium, Middleton. Clinic at 5 p. m. Dinner at 7 p. m. Speaker: Dr. John B. Hawes, 2nd. Subject: Dust and Disease.

MARCH 2 — Lynn Hospital. Clinic at 5 p. m. Dinner at 7 p. m. Speaker and subject to be announced.

APRIL 6 — Gloucester Hospital, Gloucester. Clinic at 5 p. m. Dinner at 7 p. m. Speaker and subject to be announced.

MAY 5 — Censors meet at Salem Hospital, 3:30 p. m.

MAY 11 — Annual meeting, Salem Country Club, Peabody. Dinner at 7 p. m. Speaker and subject to be announced.

FRANKLIN

Meetings will be held at the Franklin County Hospital, Greenfield, at 11 a. m. the second Tuesdays of January, March and May.

HAMPDEN

Meetings will be held on the fourth Tuesday in January, April and July.

MIDDLESEX EAST

Meetings will be held at the Bear Hill Golf Club, Stoneham, at 12:15 p. m. on January 12, March 16, and May 11.

MIDDLESEX NORTH

Meetings will be held at the Vesper Country Club, Lowell, on January 26 and April 27.

NORFOLK DISTRICT

JANUARY 25 — Hotel Kenmore. 8:15 p. m. The Management of Uterine Prolapse. Dr. Louis E. Phaneuf.

FEBRUARY 23 — Hotel Kenmore. 8:15 p. m. Dermatitis Venenata Due to Cosmetics and Industrial Irritants. Dr. John G. Downing. Discussion by Dr. Francis P. McCarthy.

MARCH 29 — Hotel Kenmore. 8:15 p. m. Subject to be announced but to be related to diseases of the kidney. Dr. Albert A. Hornor.

MAY — Annual meeting.

The censors meet on the first Thursdays of May and November in each year.

NORFOLK SOUTH

Meetings held at 12 noon.

JANUARY 6 — Norfolk County Hospital, South Braintree.

FEBRUARY 3 — Norfolk County Hospital, South Braintree.

MARCH 3 — Norfolk County Hospital, South Braintree.

APRIL 7 — At the Quincy City Hospital.

MAY 5 — Annual Meeting.

PLYMOUTH

Meetings will be held at 11 a. m. on January 20, March 17, April 21, May 19 and July 21.

SUFFOLK

JANUARY 19 — Joint meeting with Boston Medical Library.

MARCH 15 — Joint meeting with Boston Obstetrical Society.

WORCESTER

At the following meetings, except the annual meeting, dinner will be at 6:15, to be followed by business session and scientific program.

JANUARY 12 — Worcester City Hospital, Worcester.

FEBRUARY 9 — Worcester State Hospital, Worcester.

MARCH 9 — Memorial Hospital, Worcester.

APRIL 13 — Hahnemann Hospital, Worcester.

MAY 11 — Afternoon and evening, annual meeting. Place and schedule of program to be announced.